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INDIAN CASHEW JOURNAL



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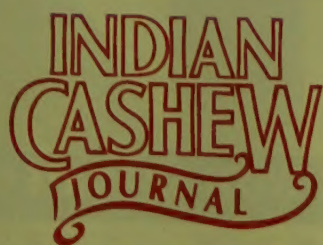
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Editor, Printer & Publisher

Dr. K.G. Nayar

Food For Thought

A PHYTOCHEMICAL RENAISSANCE FOR NUTS?

An enormous body of information on phytochemicals is seen by some as the dawning of the Second Golden Age of Nutrition. If research into phytochemicals continues at this pace-and there's no reason to believe it won't -phytochemicals will be to the 20th century what vitamins were to the first half of the 20th century.

Just what are these amazing chemicals? Nuts, whole grains, fruits and vegetables contain phenolic compounds, terpenoids, pigments and other natural antioxidants that have been associated with protection from and/or treatment of chronic diseases. Most consumers are aware of some of these substances. Despite the fact that phytochemical research is still in its infancy, there's no doubt that the food industry already has begun to benefit from the findings.

While nuts have always had a reputation for adding premium value to food products for taste and texture reasons, they also contain a variety of phytochemicals and are just now being recognized for their nutritional role as more than a source of protein. "Research from the Nurse's Healthy Study shows that those women who ate just five ounces of nuts per week decreased the risk of cardiovascular heart disease by 35 percent compared to those who rarely ate nuts," says Maureen Ternus, M.S.R.D., spokesperson for the International Tree Nut Council. While some of this effect is no doubt due to the fact that the fat in tree nuts is at least 85 percent unsaturated, researchers believe nuts' phytochemical content may also be a factor.

All nuts contain flavonoids, says Ternus. In general, flavonoids extend the activity of vitamin C, act as antioxidants, protect LDL cholesterol from oxidation of unsafe cholesterol oxides, inhibit platelet aggregation, and have anti-inflammatory and anti-tumor action.

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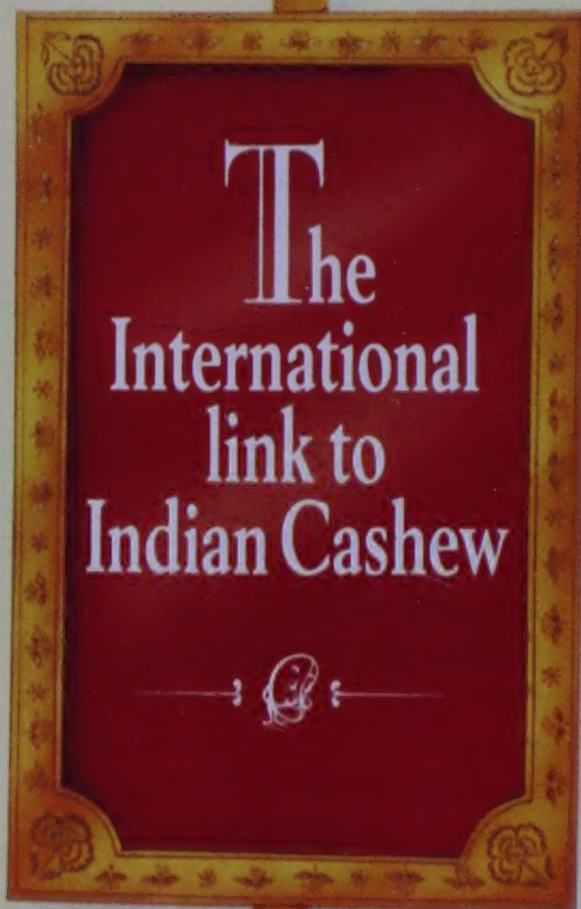
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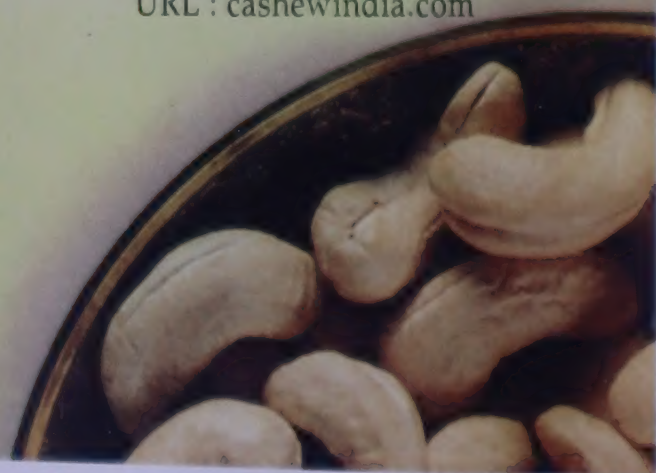
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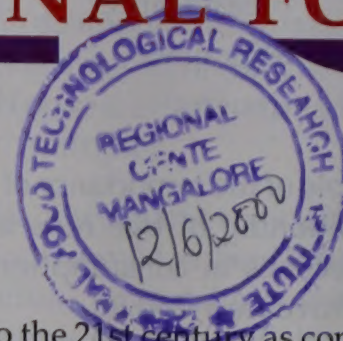
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NUTS

THE FINEST FUNCTIONAL FOOD



There is no universally accepted definition of functional foods: however, several organizations have attempted to define this emerging food category. The International Food Information Council (IFIC) defines functional foods as foods that provide health benefits beyond basic nutrition. This definition is similar to that of the International Life Sciences Institute of North America (ILSI), which has defined functional foods as foods that, by virtue of physiologically active food components, provide health benefits beyond basic nutrition. The Institute of Medicine of the National Academy of Sciences limits functional foods to those in which the concentrations of one or more ingredients have been manipulated or modified to enhance their contribution to a healthful diet.

According to these definitions, unmodified whole foods such as fruits, vegetables and nuts represent the simplest example of a functional food. For example, broccoli, carrots, or tomatoes would be considered functional foods because they are rich in such physiologically active components as sulforaphane, beta carotene, and lycopene, respectively. Modified foods, including those that have been fortified with nutrients or enhanced with phytochemicals or botanicals, also fall within the realm of functional foods. In addition, food biotechnology will continue to provide new venues for functional food development.

Although the term "functional foods" may not be the ideal descriptor for this emerging food category, recent focus-group research conducted by IFIC showed that this term was recognized more readily and was also preferred by consumers over other commonly used terms such as "Nutraceutical" or "designer foods".

As the largest organization of dietetics professionals, The American Dietetic Association classifies all foods as functional at some physiological level. The term functional food should not be used to imply that there are good foods and bad foods. All foods can be incorporated into healthful eating plan the key being moderation and variety.

Development of functional food products will continue

to grow well into the 21st century as consumer demand for these products is heightened. Factors contributing to this reshaping of the food supply include:

- ♦ an aging population
- ♦ increased health care costs,
- ♦ self-efficacy and autonomy in health care,
- ♦ advancing scientific evidence that diet can alter disease prevalence and progression and
- ♦ most importantly, changes in food regulation.

Nutrients and nonnutritive food components have also been associated with the prevention and / or treatment of chronic disease such as cancer, coronary heart disease, diabetes, hypertension, and osteoporosis. As the data supporting the role of diet in health promotion and disease prevention continue to mount, it is likely that the quantity of enhanced foods will expand substantially. Functional foods are viewed as one option available to consumers seeking cost-effective health care and improved health status, and they will continue to transform the global food supply.

Why Nuts Are a Functional Food

The International Nut Council and others are fighting hard to put nuts on the healthy eating menu by "reinventing" them as functional foods.

During the 1990s nut consumption declined dramatically in many countries because of consumers turning away from products they considered high in fat. But now the tree nut industry is fighting hard to put them back on the healthy eating menu by "reinventing" them as functional foods that is, trendy ingredients with positive health attributes.

The discovery of nuts as a functional food packed full of positive, health enhancing nutrients is one of the flip-sides to the functional foods revolution currently sweeping through the developed world's food industry. Tree nuts, often thought of as unhealthy by consumers in the 1980s as they embraced nutrition advice about fat consumption, are now able to portray a positive nutrition



message to consumers on the basis of their functional or nutraceutical qualities.

Top 5 Health Concerns in Europe (female)

UK	FRANCE	GERMANY
Breast Cancer	Lack of Energy	Breast Cancer
Stress	Stress	Lung Cancer
Lack of Energy	Breast Cancer	Colon Cancer
Heart Disease	Migraines	Memory Loss
Osteoporosis	Coughs	Heart Disease

A dramatic example of the importance of this trend is the nutritional repositioning of tree nuts in the last ditch chance to halt declines in consumption as consumers turned away in droves to avoid fat.

During the past two years the industry has embarked on a sophisticated programme of scientific research and to educate opinion leaders on how nuts can fit into a healthful diet.

In April this research programme started to pay off with some eye catching headlines. Preliminary results from one study suggested that diets with nuts are good for the heart. Results have shown that nut butter, nut oil and olive oil diets, which were all low in saturated fat and cholesterol and high in monounsaturated fat, lowered total cholesterol and the harmful LDL (low density lipid) cholesterol and triglyceride levels, but did not lower levels of beneficial HDL (high density lipid) cholesterol and triglyceride levels, but did not lower levels of beneficial HDL (high density lipid) cholesterol.

One of the researchers, Dr. Penny Kris-Etherton from Pennsylvania State University said: "The positive effects from tree nut products may go beyond their content of beneficial fatty acids. The antioxidant Vitamin E, folic acid, phytochemicals, fibre, vitamins, minerals and plant protein may all contribute to heart disease protection".

Lower Cholesterol

A 1994 study, for example, published in the American Journal of Clinical Nutrition, compared the effects of almonds and walnuts on plasma lipids and heart disease. It found that both nuts were effective in lowering LDL cholesterol levels. By eating 50g of walnuts each day LDL cholesterol was lowered by up to 9%. Almonds, on the other hand, produced a 10% drop in harmful LDL cholesterol.

In another more dramatic study Dr. Gene Spiller of the Health & Research Studies Center, Los Altos, CA., found that 100g of almonds a day reduced cholesterol by 12% compared to a reduction of 5% for olive oil.

Other studies have confirmed that tree nuts potency in lowering levels of harmful blood cholesterol is twice that of olive oil. It is hardly surprising that nutrition researchers have recommended that an increased dietary intake of nuts form part of population dietary guidelines.

There are a number of hypotheses as to why tree nut rich diets might be successful at lowering blood cholesterol levels.

- Tree nuts are a good source of monounsaturated fat and contain very little saturated fat (mono to saturated fat ratio is 10 to 1).
- Tree nuts contain substantial amounts of dietary fibre. Fibre is believed to have cholesterol-lowering effects.
- Some of the arginine-rich proteins found in tree nuts have been documented to have beneficial effects on blood lipids, compared to animal proteins.
- There are as yet not fully understood effects from the phytochemicals, such as plant sterols and saponins, on reducing blood cholesterol levels.

Cancer Treatment

One of the earliest studies into almonds and cancer, was carried out by Dr. Kris Etherton, Professor of Nutrition, and Dr. John Milner, Professor and Head of Department of Nutrition, both at The Pennsylvania State University.

The Pennsylvania researchers used tumour cells in culture to explore the specific phytochemical action of almonds on cancer cell proliferation. The in-vitro study found that two flavonoid phytochemicals in almonds - quercetin and kaempferol, were strong suppresser of both lung and prostate tumour cell growth.

One way in which these compounds may be active in cancer prevention is by interfering with the

Unmodified whole foods such as fruits, vegetables and nuts represent the simplest example of a functional food... development of functional food products will continue to grow well into the 21st century as consumer demand for these products is heightened.

SNACKS MAKE KIDS SMARTER

According to surveys, 66% of school age children are zinc deficient. A solution: half a cup of dry-roasted cashews almonds or pecans, which supply one-third of a child's daily value.

Studies show that when zinc deficient kids are given 20 mg. daily, their reasoning abilities improve 30%. That serving will also supply a 3-mg, boost of boron, and research shows 3 mg a day improves short term memory and concentration. Boron improves electrical activity in the brain, which may explain why people feel more alert when they take it. It also improves dexterity, helpful if your child plays sports.



cancer-promoting actions of particular hormones. A substantial and growing body of evidence linking phytochemicals and cancer prevention has been accumulated on three classes of these compounds: flavonoids, plant sterols and plant sulfur compounds. However, more research is needed to qualify and quantify the phytochemicals found in nuts and clarify their effects on health.

Top 5 Health Concerns in Europe (males)

UK	FRANCE	GERMANY
Heart Disease	Stress	Heart Disease
Stress	Heart Disease	Prostate Cancer
Prostate Cancer	Prostate Cancer	Lung Cancer
High Blood Pressure	Lack of Energy	Colon Cancer
Lack of Energy	High Cholesterol	Memory Loss

Blanched tree nuts can be ground up to make flour and are already used extensively in the "wholefood" industry for bakery products, such as muffins, for consumers on high-fibre diets. There are processing challenges with the flour, but as research on the health benefits of tree nuts accumulates and industry's awareness of it grows, we may see increased interest in the flour from the mainstream bakery industry. Interest can also be expected to rise in the use of nut oil as an ingredient and the use of tree nuts in breakfast cereals. Changing consumer trends towards foods and ingredients with enhanced health benefits has come just at the right time for nuts.

The Origin of Functional Foods

Some herbs have a long and important history of culinary use. They are precursors to looking at certain whole foods like tree nuts as a functional food with nutritional, even medicinal value. Others have a long history of medicinal use. The most-quoted example of these is St. John's Wort, used in Germany for many years as a treatment for depression and available on prescription. The search for "functional food" ingredients with marketable health benefits is now luring food makers into adding medicinal herbs to foods. Herbs have suddenly become a hot topic. It is a development fraught with uncertainty and risk.

The recent revival of consumer interest in the therapeutic properties of herbs - fueled by reports in the mainstream media - has led to an explosion of consumer

WEIGHT WATCHERS ADD NUTS

Weight Watchers is considering adding nuts to their new 1-2-3 weight loss program as an alternative snack item. In addition, some nut industry folks are pursuing a structure-function claim on food labels. The claim could read, if approved, "Nuts help promote healthy cholesterol levels as part of a diet low in saturated fat and cholesterol."

demand for herbal products, particularly in the US. Herbal sales have thus far predominantly been in the form of dietary supplements, but the allure of high margins is bringing a growing number of herbal fortified products onto the market.

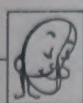
For example, in the UK, drinks manufacturers Pete & Johnny recently launched "the first vitamin-enriched juices with natural herbal remedies, "two chilled fruit drinks containing echinacea and guarana and aimed "at the youth and style markets or anyone wanting to boost their health with no real effort". Already they are listed in national retail multiples.

Herbs entered the dairy market late last year when New Zealand dairy company Mainland launched one of the world's first herbal yogurt lines with three flavors containing echinacea, ginseng and ginkgo biloba. That's been followed by the launch last April of Swiss dairy company Toni's aloe vera yogurt. Confectionery, chewing gum and energy bars are also popular vehicles for herbal ingredients, as are snack foods. US company Robert's American Gourmet uses ginkgo biloba, echinacea, kava kava and cats claw, sprayed onto its corn chips, spirals, puffs and onion rings. St. John's Wort has even made an appearance in soup in the "Prescription Kitchen" range launched in the US by Hain Foods, one of the country's biggest "natural foods" companies, with annual sales over US\$300m.

Consumers, increasingly conscious of the link between food and health, and aware of certain herbs - especially those propelled to "Superstar" status by mainstream media - are accepting these new products. Dr. Philip Ashurst of Pointing Group UK spoke at the recent Vitafoods conference in Geneva of the "ready availability of herbal preparations in non-licensed forms that makes them attractive to many consumers". Because many people believe that echinacea will help with colds and flu or that St. John's Wort is good for depression, companies who concentrate on these well-known herbs may have to do little to persuade consumers of the benefits.

New Markets

Herbs as functional ingredients in food and drinks have the potential to be more than a "flash in the pan". As attention focuses on the specific health needs of population segments such as women, men and the elderly, and researchers discover more health benefits of herbs, new niche markets are bound to arise. The so called "grey market" is one such niche. Research has highlighted the benefits of ginkgo biloba for vascular conditions and dementia and saw palmetto for prostate conditions, for instance, and herbs like these could figure in this market. And "gender-specific" herbs, such as black cohosh and astragalus for women or saw palmetto for men, are beginning to receive attention and could soon appear in foods and beverages in the US.



5 member states have developed Voluntary Codes of Practice on Health Claims:

Netherlands, France, Belgium, Sweden & UK.

Formally these are voluntary agreements and not legally enforceable, but they do have common components of: participants, enforcement, types of claims, wording and scientific assessment.

The flip side of this herbal renaissance is - often - justified - skepticism over safety and efficacy issues. Not all herbs are entirely safe and not all food formulated with herbs will have a significant or meaningful therapeutic effect. While some products reflect the attention manufacturers have paid to these issues, others, especially in America, suggest that for some manufacturers anything goes. As consumers become increasingly savvy about functional and fortified foods, products with uncertain benefits stand to lose their own credibility as well as putting the credibility of the whole functional and fortified arena at risk.

A Global Crackdown

Leading consumer advocacy organizations in Japan, the UK and the US have already banded together to call for a crackdown by regulatory authorities on the marketing of functional foods, citing products formulated with medicinal herbs as examples of "a market place free-for all of false health promises and misleading claims.

The International Association of Consumer Food Organizations (IAFCO) is pushing for regulators to ensure that all functional ingredients, including herbs, are safe and that label claims are valid.

Simon Pettman of Consultancy European Advisory Services says the European regulatory situation is unclear: "In most countries there is a list of herbs which can be sold under food law and /or a list which is sold under a simplified medicinal procedure. However, the question of whether these herbs which have primarily been considered for supplement or medicinal use can also be used for food ingredients is open to debate".

There are significant national differences with regard to the regulation of herbs. The Netherlands' relatively open model, in which herbs are permitted to be sold under food law as long as they are considered safe within the food law context, contrasts with the situation in Germany where the vast majority of nonculinary herbs are restricted to medicinal classification and are sold as OTCs (although there are no restrictions on outlets for these products). But the German situation faces change, as shown by the legal challenge to Muller's yogurt containing St. John's Wort. The results of this court case, could provide a hint of the future.

FORECAST VALUE GROWTH RATES (%) OF FUNCTIONAL VS. TRADITIONAL FOOD & DRINK IN UK 1998-2000

	Functional	Traditional
Cereals	0.5	-2.6
Confectionery	2.2	-1.9
Fats & Spreads	12.4	1.8
Dairy	10.1	1.6
Soft Drinks	7.0	5.0

Meanwhile, the strength for a consuming public to recognize the nutrition benefits of a whole food like tree nuts continues to grow. While the future of herbs may be in question, the future for tree nuts keeps getting brighter as the industry continues to plow more currencies into research.

AHA OKS MONO FATS

Nutrition experts have maintained for some time that it's not how much fat you eat but the type of fat that affects heart disease risk. The American Heart Association (AHA) has resisted joining the rowing chorus - until now. Reporting last September in the *Circulation*, the organization gives its stamp of approval to diets high in monounsaturated fats, as long as saturated fat intake is kept to a minimum and calories are not excessive. Olive oil, nuts and avocados are particularly rich sources of the heart-protective mono fats.

In population studies, Mediterranean-style diets (typically rich in monos) are consistently linked to less heart disease. And clinical trials have shown that nuts (all high in monos reduce total blood cholesterol without lowering HDLs ("good" high-density lipoprotein cholesterol), in contrast to a low-fat, high-carbohydrate diet.

What's the secret behind mono fats? They reduce the stickiness of blood platelets, inhibiting clot formation, and may also help dissolve clots once they form.



The market for packaged savoury snacks (excluding ethnic Chinese snacks) in China and Hong Kong was worth almost RMB 590 million in 1997, representing growth of 43 per cent since 1993. By far the greatest part of the market is packaged nuts, which accounted for more than 95 per cent of sales value in 1997, reflecting their longstanding popularity as a snack food in China.

With the influx of foreign products and increased production by joint ventures in an undeveloped sector, sales of potato crisps have experienced exponential growth. They leapt by 202 per cent in current value terms between 1993 and 1997, compared to 40 per cent growth for packaged nuts.

Within this sector peanuts stand out as the nation's absolute favourite, representing 84.3 per cent of volume sales. As for crisps, the most popular flavour among the Chinese population appears to be barbecue, with 24.6 per cent of value sales.

Sales of extruded snacks are still negligible in China, although demand is emerging in major consumer markets such as Shanghai and Beijing for products such as puffed corn snacks. Western style extruded snacks are having to compete with established traditional snacks,

such as rice crackers, and their sales are concentrated in major cities such as Beijing, Tianjin and Shanghai. Overall savoury snacks volume sales increased by 10.5 per cent from 11400 tonnes in 1993 to 12600 tonnes in 1997.

Hong Kong's total retail sales of savoury snacks exceeded HK\$1000 million in 1997, representing a 28 per cent increase over 1993 in current value terms. In value terms the potato crisps sector, worth almost HK\$415 million in 1997, accounts for the largest share of the market. However, packaged nuts are the most consumed snacks, representing over 36 per cent of total volume sales.

As Hong Kong residents are becoming increasingly health-conscious, new launches have tended to focus on healthier snacks. As a result, products with

lower calories, less salt and more natural flavourings flourished over the period.

Over the next five years retail sales volume is forecast to increase by 26 per cent, reflecting the growing consumption of savoury snacks in China. Mainland China's retail volume is set to increase its significance in the overall combined China and Hong Kong market and is predicted to achieve a 53 per cent share in the year 2002.

SNACKING SPRINTS AHEAD IN CHINA AND HONG KONG

SAVOURY SNACK RETAIL SALES VOLUME IN CHINA AND HONG KONG 1998-2002.

'000MT	1998	2002	% growth 1998-2002
China	12.6	16.3	29.4
Hong Kong	11.8	14.4	22.0
TOTAL	24.4	30.7	25.8
Hong Kong as % total	48.3	46.8	

Source : Euromonitor

SAVOURY SNACK RETAIL SALES VOLUME BY SECTOR IN CHINA AND HONG KONG 1993-1997

'000MT	1993	1997	% growth 1993-1997
Potato crisps	0.18	0.41	127.8
Packaged nuts	11.25	12.18	8.3
TOTAL	11.43	12.59	10.1

Source : Industry estimates/Euromonitor



CEPC LABORATORY AND TECHNICAL DIVISION

The Centre has the following facilities

- ◆ To assist the food processing industries in India to acquire ISO/HACCP quality system certification.
- ◆ To undertake periodical inspection of cashew factories and other food processing units and to provide advice on subjects like proper upkeep of the premises, good manufacturing practices and personal hygiene.
- ◆ To draw up standards for raw cashewnut - both Indian and imported.
- ◆ To undertake quality evaluation and certification of raw cashewnuts, cashew kernels, cashewnut shell liquid and other edible and potable products.
- ◆ To impart training to factory workers, supervisors and managers in cashew and other food industries on better and hygienic processing of products to international standards of quality, safety and packaging specifications.
- ◆ To collect international quality procedures and techniques and disseminate the information amongst the farmers, traders, processors and exporters.
- ◆ To serve as a technology transfer organization for quality assurance, production, processing and packaging.
- ◆ To function as a reference centre on cashew and other food products for exporters in India and importers abroad.
- ◆ To assist in studies on ideal packaging techniques and analysis and testing of packaging materials in association with the Indian Institute of Packaging.
- ◆ To assist in studies on new uses of cashew kernels, cashewnut shell liquid, cashew apple, cashew testa and cashew shells and to analyse cashew kernels, cashew apple and products made with them for nutrition content and food value in association with national institutions like CFTRI, NIN and CSIR.
- ◆ To undertake tests for mycotoxins, biotoxins, fumigants, Poly Chloro Biphenyls (PCBs), Penta Chloro Phenols (PCPs), Poly Aromatic Hydrocarbons (PAHs), bacterial toxins, drug residues, enzymes, toxic metallic residues, chemical additives, tests as per Nutritional Labelling and Education Act (NLEA) etc.
- ◆ To undertake commodity specific tests to the satisfaction of the buyers of agricultural and food products from India.

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EFFECT OF ANTIOXIDANTS ON THE SHELF LIFE OF CASHEW KERNELS

Jisha K. G., Rekha Ravindran, Padma Nambisan*

ABSTRACT

Cashew kernels have high nutritive value. Upon exposure to air, kernels turn rancid and their nutritive value decreases. From this study it is concluded that chemical treatment using antioxidants reduced oxidative rancidity but failed to prevent deterioration in organoleptic characteristics and decrease in protein and carbohydrate content of stored kernels.

Introduction

The change that a lipid undergoes leading to an undesirable flavour and odour is called rancidity (1). Cashew kernels on exposure to air undergoes oxidative rancidity. Here, fats react with oxygen producing products with undesirable characteristics. Also, nutritive value of such spoiled kernels show a decrease (2)

The role of chemicals in food preservation has been recognised for a very long time now. Many chemicals protect flavour, texture and storage stability of food stuffs (2). Antioxidants are used to preserve food materials containing fats. They function as free radical acceptors, terminating the oxidation of oil at the initial step. Synergism has been noticed in the case of antioxidants where the combined effect of two or more antioxidants produces an effect greater than a single one alone (2).

Materials and methods

Commercially available plain cashew kernels sealed in CO filled packets were used as sample. Different antioxidant compositions as detailed in Table-1 were used to treat the kernels by three methods.

- (1) Wet treatment in which the antioxidants were dissolved in water and kernels dipped in it for 5 minutes and spread on a filter paper for drying.
- (2) Dry treatment in which the antioxidants were mixed on percentage by weight basis of cashew kernels and mixed with them and
- (3) Wet followed by dry treatment in which kernels dipped in solution were dried in oven at 53°C for 40 minutes.

Treated kernels as well as control (untreated) kernels were stored at 80% humidity. After 20 days oil was extracted using Soxhlet apparatus and oxidative rancidity measured by determining Iodine value and peroxide value. Protein and carbohydrate contents of defatted seed meals were determined by Lowry et al (3) and anthrone / Sulphuric acid method respectively.

Moisture content of the treated kernels was determined and computed using the equation:

$$\% \text{ of moisture content} = \frac{\text{Initial weight} - \text{Final weight} \times 100}{\text{Initial weight}}$$

* Plant Biotechnology Unit, Department of Biotechnology, Cochin University of Science and Technology, Cochin 682 022.



Results and discussion

1. Effect on organoleptic characteristics

The antioxidant treatments tested failed to prevent deterioration of organoleptic characteristics of stored kernels. Generally all the treatments resulted in unfavourable characteristics like browning, mold growth etc. (Table-2). Browning may be attributed to the ability of antioxidants to undergo discolouration (4). Water soaked appearance was due to the hygroscopic nature of antioxidants and moisture absorption of raw kernels. The difference in treatment response can be attributed to the water content absorbed by treated kernels (Table-3).

Water content was found to increase in the order wet followed by dry and wet treatments. In all the treatments high concentration of antioxidants resulted in increased deterioration as the moisture content is higher due to their hygroscopic nature.

2. Antioxidants are not effective in preventing decrease in protein and carbohydrate content of stored cashew kernels.

The study shows that under high humidity kernels show a decrease in protein and carbohydrate contents (Table-4). Use of antioxidants could not prevent this. In fact as their concentration is increased the decrease in these components is more. The proportion, concentration and mode of application of antioxidants

influenced rancidification.

The rancidification was maximum, as evident from Iodine value, in wet treatment with maximum concentration of citric acid and ascorbic acid. It was minimum in wet followed by dry treatment with low concentration of citric acid and ascorbic acid (Table-4)

High concentration of antioxidants were undesirable as they promoted mold growth leading to hydrolytic rancidification.

Thus it may be concluded from this study that antioxidant treatments reduced oxidative rancidification but could not prevent deterioration in organoleptic characteristics and nutritive value.

Table - 1

TREATMENT PERCENTAGE COMPOSITION

Method	Citric acid	Ascorbic acid	Propylgallate	Code
Wet	5	5	-	W-1
	10	10	-	W-2
	10	5	-	W-3
Dry	5	5	-	D-1
	10	10	-	D-2
	10	5	-	D-3
	-	-	5	D-4
Wet followed by dry	5	5	-	W/D-1
	10	10	-	W/D-2
	10	5	-	W/D-3



Table - 2

ORGANOLEPTIC CHARACTERISTICS OF KERNELS SUBJECTED TO ANTIOXIDANT TREATMENTS:

A-wet treatment ; B - Dry treatment ; C- wet followed by dry treatment

Treatment code	Time in days	Organoleptic characteristics		
		Browning	Rubber like texture	Moldgrowth
W-1	2	+	+	-
	10	++	+	+
	14	+++	+	+++
W-2	2	+	+	-
	8	++	+	+
	14	+++	+	+++
W-3	1	-	+	-
	2	+	+	-
	10	++	+	+
	14	+++	+	+++
D-1	2	-	+	-
	4	+	+	-
	16	+++	+	+
D-2	3	+	+	-
	12	++	+	+
	16	+++	+	+++
D-3	2	-	+	-
	4	+	+	-
	14	++	+	+
	16	+++	+	+++
D-4	2	+	+	-
	14	++	+	-
	17	++	+	+
W/D-1	2	+	+	-
	5	++	+	-
	18	+++	+	+
W/D-2	2	+	+	-
	3	++	+	-
	17	+++	+	+
W/D-3	2	-	+	-
	5	+	+	-
	18	+++	+	+
Control	4	+	+	-
	17	++	+	-
	24	++	+	+
	30	+++	+	++

(- Nil, + Mild, ++Moderate, +++ Maximum)



Table - 3

ESTIMATION OF MOISTURE CONTENT OF ANTIOXIDANT TREATED KERNELS

Treatment	Moisture content (%)
Control	9.54
W-1	11.8
W-2	11.31
W-3	11.22
D-1	10.03
D-2	10.96
D-3	10.45
W/D-1	9.89
W/D-2	10.28
W/D-3	9.7

Table - 4

EFFECT OF ANTIOXIDANT TREATMENTS ON RANCIDIFICATION OF CASHEW KERNELS, PROTEIN CONTENT AND CARBOHYDRATE CONTENT.

Treatment code	Protein (mg) / g	Carbohydrate (mg) /g kernel	Iodine value	Peroxide value
Control	107	84.24	78.51	-
W-1	91.5	73	81.53	-
W-2	70	68.75	76.34	-
W-3	86	71.25	81.08	-
D-1	101.5	78	81.5	-
D-2	35	71.5	79.74	-
D-3	91.5	74.5	81.02	-
D-4	75.25	67.75	77.4	-
W/D-1	115.5	82.25	84.09	-
W/D-2	97.5	76	78.19	-
W/D-3	105	79.75	78.73	-

Acknowledgement

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NUTS FOR BETTER NUTRITION

Nuts are a complex plant food. They are an excellent source of fibre, vitamin E, magnesium, zinc, selenium, copper, zinc, potassium, phosphorous, biotin, riboflavin, niacin and iron. Many nuts are also a great source of folic acid which has been shown to reduce the instance of birth defects when taken by pregnant mothers.

Nuts may also be a source of helpful biologically active components found in plant foods, such as phytochemicals. Phytochemicals are compounds that are potentially beneficial to people, but are currently not classified as vitamins or minerals. They are important "health protectants". Phytochemicals in nuts include ellagic acid, flavonoids, phenolic compounds, luteolin (a major antioxidant), isoflavones and tecotrienols. Some nuts contain up to eight different forms of sterols which are thought to help moderate cholesterol levels. Nuts appear to contain a number of these phytochemicals although further analysis needs to be conducted as new technology is developed to measure exact amounts.

Not all fat is the same

Despite being commonly thought of as "bad for you", fat is essential for our bodies to function properly. While many people eat too much fat. It is nevertheless necessary to consume some fat. An ounce of nuts has between 165 and 200 calories and contains between 14 and 21 grams of fat. About 80 per cent of the calories in nuts comes from fat. However, monounsaturated and polyunsaturated fatty acids make up

most of that fat (more than 90 per cent on average).

Unsaturated fats are generally thought of as the "good" fats, as opposed to artery-clogging saturated fats, mostly found in animal products such as butter and meat. Because the fat in nuts is unsaturated, nuts can actually work to lower total (or serum) cholesterol and "bad" LDL cholesterol.

Diets high in saturated fat contribute to high levels of low-density lipoprotein (LDL) or "bad" cholesterol. Too much saturated fat in the diet also unfortunately reduces "good" high-density lipoprotein (HDL) cholesterol levels.

Most nuts are very low in saturated fats. Opinion polls have shown that many people mistakenly believe that nuts contain cholesterol. There is no cholesterol in nuts because they are a plant product - and cholesterol is found only in animal products.

An ancient food

Not only are nuts health-enhancing for modern people, they were probably one of the reasons that people first settled in villages. Recent archaeological excavations at the village of Hallan Cemi in eastern Turkey, settled some 10000 years ago, have uncovered the existence of a non-migratory society with economies centred on the harvesting of almonds and pistachios. The work of Michael Rosenberg, Ph.D., has shown that this settled village life preceded the development of agriculture. It is possible that nut-centred societies not only preceded agricultural ones, but that

the harvesting of wild nuts may have actually fostered agriculture.

Although the conventional view has been that civilisation grew out of the areas in which people exploited cereal grains, Dr. Rosenberg's research shows that it is more likely that civilisations first relied on nuts, then later moved on to grains as a staple food. Since nuts grow on trees, they are a more predictable food source each year than smaller, less hardy plants such as grains which might be damaged by more severe weather. In addition, nuts can be stored easily through long winters, providing year-round food. "In a very real sense", says Dr. Rosenberg. "nuts weren't just a staff of life, they were probably the first one".

Nut consumption and disease

Most industrialised societies today are concerned with eating too much food - and too much animal protein and fat - rather than too little food. While we are normally bombarded with bad news about the foods we love, here's some good news. Although scientists are not certain why, a growing body of research shows nuts to be useful in improving cardiovascular health. Some possible reasons include nuts' high ratio of unsaturated fat to saturated fat, their high fibre content, and their high fibre content, and their antioxidant content or other unknown components.

(This article was excerpted from the highlights of the Nuts and Nutrition, the Role of a Complex Plant Food in the Diet roundtable conference held in San Francisco.)



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Cashews Must Escape The Snack Food Trap

Jim Phipps*

CASHEWS are primarily consumed in the West as snacking nuts, either roasted and salted alone or mixed with other nuts. Sales patterns have evolved from the early days of freshly roasted product still warm in the local nut shop and packaged product sold in grocery stores and supermarkets.

Today cashews are sold largely in discount stores where the combination of attractive pricing for a volume package from the consumer's perspective ties in nicely with large sales volume for the retailer.

In addition, at least in the US market, cashews have appeared on the shelves of convenience stores and petrol station shops. In those outlets, the product is poorly displayed and merchandised as a discount item. Consumption of cashews has been rather flat in the traditional consuming countries for the past several years. Certainly some people in the industry appear convinced that only low prices will permit increased consumption.

The fight for shelf space has led to the widely-accepted view that cashews and the entire nut category face an uphill battle in the quest for the consumer dollar against a host of alternative "snack food" choices that

include potato chips, pretzels, and a never-ending stream of newly introduced extruded snacks.

Somehow the cashew, the king of nuts, has been stuck in a category with the lowest form of junk foods. These products lack any real flavour characteristics, being composed entirely of salt and artificial flavouring, and are heavily reliant upon huge advertising budgets.

Certainly the nutritional values of these snack products cannot be compared to the nut family or to the cashew. The recent publication of

the Mediterranean diet and of the role played by nuts in that diet pointed out the nutritional value and health benefits derived from nuts.

Superior Quality

It is time to recognize that cashews remain a superior and very special item and that they have to be merchandised as such.

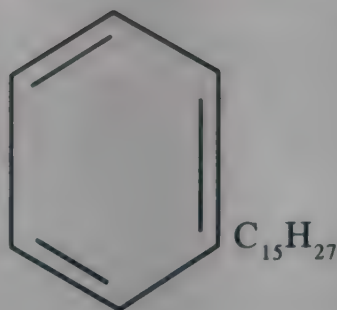
The message that needs to be conveyed to capture the consumer's interest is that cashews are unique and possess flavour and textural components that set them apart from



**With a total of 25 years experience in the commodity trading business, Jim Phipps has spent the last 12 years as president of Red River Foods, a U.S. importer of cashews, brazil nuts, pinenuts, apricot, banana chips, pineapple and dried apple. He has served as Chairman of the Association of Food Industries and is a member of the Tree Nut and Peanut Processors' Association.*



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all other nuts while at the same time setting the quality standard for any mixed nut blend.

We will never be able to provide cashews or mixed nuts at a price that competes with potato chips and other snacks. We should not even try. If these attributes are combined with the positive nutritional message that is now being put forward, then the stage is set for promoting increased nut consumption both as a snack item and as an ingredient in recipes.

Cashews are widely employed in the traditional cuisine of many countries. It seems odd that with the US and Western Europe as the main consuming countries, the predominant form of consumption is as a salted snack, with very little taking place in the usage of cashews as an ingredient in recipes. There is some usage in confectionery and baking products, and the potential to expand the role through increased usage of the many broken grades available as a by-product of the shelling process.

Yet the cashew is used as a key ingredient in the ethnic dishes now increasingly adopted in the west. Chinese, Vietnamese, Thai and Indian restaurants feature cashews with fish and fowl. In Brazil, entire cook books are devoted to recipes employing the cashew nut.

We can see how this demand may be generated by looking at pignolia nuts, for example. These have never been packed and sold by a

major company in any of the consuming countries. Despite that fact, they have become extremely popular in the US. They are not sold as a snacking nut, they are not sold in mixed nuts and they certainly do not compete for the consumer dollar with other snacks given that the current retail price is well over US\$10.00/lb.

Pinenut usage took off in the U.S. when food writers began extolling

Fresh image for cashews?

Cashews are clearly the leader of the pack in terms of quality and image. If we can convey both the healthy aspects of cashews and the unique contribution that they can make to both traditional and newly created dishes, then consumption of cashews may soon exceed production.

Too few companies are offering raw cashews as an ingredient. Too few



the virtues of pinenuts as an ingredient lending a unique flavour and textural quality to various dishes. Consumers liked them and asked about them; retailers heard about them and asked their suppliers to provide them.

The discount stores brought the product from the big cities to every corner of the U.S. Demand now exceeds supply. The same can be done with cashews.

recognize the demand and potential to promote consumption without the need to spend. We need to move forward as an industry and recognize that grassroots promotional activity at a local level quickly expands to national exposure.

With innovation like the Internet, the word can spread rapidly with knowledge and demand moving in tandem. The opportunity is there and waiting...

...all we need to do is seize it.



NUTRIENTS IN 100G OF TREE NUTS

NUTRIENT	UNITS	ALMONDS	CASHEWS	HAZELNUTS	MACA-DAMIAS	PECANS	PISTA CHIOS	WALNUTS
Calories	KCAL	578	574	628	716	691	567	654
Protein	G*	21	15	15	8	9	21	15
Total Fat	G	51	46	61	76	72	46	65
Carbohydrate	G	20	33	17	13	14	27	14
Fiber	G	12	3	10	8	10	10	7
Sugars	G	5	NA	4	4	4	8	3
Calcium	MG**	248	45	114	70	70	108	104
Iron	mg	4	6	5	3	3	4	3
Magnesium	mg	275	260	163	118	121	120	158
Phosphorus	mg	474	490	290	198	277	485	346
Potassium	mg	728	565	680	363	410	1033	441
Sodium	mg	1	16	0	5	0	1	2
Zinc	mg	3	6	2	1	5	2	3
Copper	mg	1	2	2	1	1	1	2
Manganese	mg	3	1	6	3	4	1	3
Selenium	mcg***	8	12	4	4	6	8	5
Vitamin C	mg	0	0	6	1	1	2	1
Thiamin	mg	0.2	0.2	0.6	0.7	0.7	0.8	0.3
Riboflavin	mg	0.8	0.2	0.1	0.1	0.1	0.1	0.1
Niacin	mg	4	1	2	2	1	1	2
Pantothenic acid	mg	0	1	1	1	1	1	1
Vitamin B6	mg	0.1	0.3	0.6	0.4	0.2	1.7	0.5
Folate	mcg	29	69	113	10	22	50	98
Vitamin B12	mcg	0	0	0	0	0	0	0
Vitamin A	IU****	10	0	40	0	77	533	41
Vitamin A	mcg RE*****	1	0	4	0	8	64	4
Vitamin E	mg ATE	26	1	15	1	4	4	3
Cholesterol	mg	0	0	0	0	0	0	0
Saturated fat	g	4	9	4	12	6	4	6
Monounsaturated fat	g	32	27	46	59	41	25	9
Polyunsaturated fat	g	12	8	8	1	22	14	47
Linoleic acid (18:2)	g	12	8	8	1	21	14	38
Linolenic acid (18:3)	g	0	0	0	0	1	0	9
Phytosterols	mg	120	158	96	114	102	214	72
Amino Acids								
Tryptophan	g	0.19	0.24	0.19	0.07	0.09	0.29	0.17
Theonine	g	0.68	0.59	0.50	0.36	0.31	0.71	0.60
Isoleucine	g	0.69	0.73	0.55	0.31	0.34	0.94	0.63
Leucine	g	1.47	1.28	1.06	0.59	0.60	1.63	1.17
Lysine	g	0.60	0.82	0.42	0.02	0.29	1.21	0.42
Methionine	g	0.19	0.27	0.22	0.02	0.18	0.35	0.24
Cystine	g	0.28	0.28	0.28	0	0.15	0.38	0.21
Phenylalanine	g	1.15	0.79	0.66	0.65	0.43	1.11	0.71
Tyrosine	g	0.53	0.49	0.36	0.50	0.22	0.44	0.41
Valine	g	0.80	1.04	0.70	0.36	0.41	1.30	0.75
Arginine	g	2.47	1.74	2.21	1.38	1.18	2.13	2.28
Histidine	g	0.59	0.40	0.43	0.19	0.26	0.53	0.39
Alanine	g	1.00	0.70	0.73	0.38	0.40	0.97	0.70
Aspartic acid	g	2.73	1.50	1.68	1.08	0.93	1.90	1.83
Glutamic acid	g	5.17	3.62	3.71	2.23	1.83	4.00	2.82
Glycine	g	1.47	0.80	0.72	0.45	0.45	1.00	0.82
Proline	g	0.97	0.69	0.56	0.46	0.36	0.85	0.71
Serine	g	1.00	0.85	0.74	0.41	0.41	1.28	0.93

Source : The Cracker



All fats are not created equal. In fact, research shows positive health effects of certain fats known as Omega-3, Omega-6 and Omega-9.

But Americans get too little of Omega-3 foods and too much of Omega-6s, researchers said at the American Dietetic Association's annual meeting in Atlanta. They gave guidelines for incorporating Omega-rich foods into the diet.

Omega foods support brain function and visual acuity. Omega-3, in particular, protects the heart by keeping vessels pliable and decreasing clotting. It has also been linked to decreased symptoms of inflammatory and autoimmune disorders. "Years ago when I wrote 'Becoming Vegetarian', I saw the information that was out there and thought that the Omegas were more important than we knew," said registered dietitian Brenda Davis.

Numerous studies show that the American diet is deficient in

By the numbers: Ratio of Omega fats needs fixing

Omega-3 (fish and leafy vegetables) but has an overabundance of Omega-6 (oils and margarine)

This inappropriate ration contributes to an increased risk of immune and inflammatory disorders, heart disease, asthma and headaches, Davis said.

Davis and others have analyzed current research and reviewed the British, Canadian and World Health Organization reference intakes for Omega foods. Davis says Omega-9 foods should account for 6 per cent to 16 percent of total energy, Omega-6 food 3 percent to 5 per cent and Omega-3 foods 1 percent to 2 percent. The average American diet has an Omega-9 intake of 8 per cent to 10 per cent, Omega-6 intake of

8 per cent to 10 per cent and Omega-3 of 0.5 percent.

Along with these guidelines, Davis says it's important to limit trans-fatty acids, which interfere with Omega-3's functions.

Foods rich in Omega-6 to limit include most cooking oils,

margarines, mayonaise, salad dressings and processed foods. However, other Omega-6 foods such as wheat germ, soy foods and various seeds should not be avoided, since they contribute Omega-3 and other beneficial nutrients.

Foods containing Omega-3 include cold-water fish, sea vegetables and algae, flaxseed and flax oil, walnuts, canola oil enriched eggs, soy products and leafy greens.

Excellent sources of Omega-9 include olives, most nuts, avocados and canola oil. ■

By Rachael Kennedy

Reprinted from the Atlanta Journal-Constitution.

NUTS

RECOMMENDED BY TRIATHLETE

Annette Cain who writes the Eat and Run column, is a certified personal trainer and triathlete with a degree in Nutrition from UC Davis in the U.S. She has nine years experience in weight management and exercise programming and has authored three books on health and fitness including the new *Shed Some Pounds the Lazy Way* and *Get in Shape the Lazy Way*. She is a professional member of the American College of Sports Medicine and the American Dietetics Association and health educator for the American Heart Association. (ablecain@pacbell.net).

"When you think about it, runners are a lot like nuts. For instance, it takes all kinds of pressure to make us crack. And its true that after we've been pounding the ground for a while we tend to get a little pasty. Of course, there are some who think runners actually are nuts!

"In any case (I guess this would be a nut case), we runners can use a few nuts as friends every now and then.

Nuts can be a delicious part of a wholesome diet. Though nuts come in different shapes and sizes, they have a lot in common, especially when it comes to their nutritious nature. They are a rich source of anti-oxidants, phytochemicals, vitamins, minerals, mono-unsaturated fat, and fiber. Nuts are also one of the best plant sources of protein."

"Some of the vitamins and minerals found in nuts include: vitamin E, folacin and other B vitamins, boron, calcium, copper, iron, magnesium, potassium, selenium, and zinc.

Besides being nutritious, nuts have other health-promoting properties. High concentrations of the amino acid arginine in nuts helps the body to form nitric oxide which in turn relaxes and opens up blood vessels to deliver more oxygen. Most nuts tend to prevent steep rises in blood sugar making them good regulators of insulin and blood glucose levels.



Nutrition in a Nutshell

Over the last few years there has been a growing number of positive studies on the health benefits of tree nuts. For instance, data from recent epidemiological and clinical studies support consumption of nuts to help reduce the risk of coronary heart disease.¹

In one particular study, researchers found that although the benefits were greatest for frequent nut eaters, those who ate nuts as little as once a week had 25% less heart disease than those who avoided nuts completely². In another study, frequent nut consumption was associated with a reduced risk of both fatal coronary heart disease and non-fatal myocardial infarction³.

While more research is needed, nuts certainly have a place in a healthy diet. Eaten alone or added to entrees, salads, baked goods and desserts, tree nuts provide wonderful texture and flavor.



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Nutrition in every handful

Tree nuts are ancient foods that have fed humanity throughout the ages. Each tree nut contains a unique blend of nutrients. Just one handful of mixed tree nuts contains no cholesterol, is low in saturated fat and provides:

- Important vitamins and minerals, such as vitamin E, folate, iron, calcium, magnesium, phosphorus, potassium, selenium and zinc.
- Mono and polyunsaturated fats
- Omega-3 fatty acids
- Protein
- Fiber
- Phytochemicals and phytosterols

The International Tree Nut Council (INC), a nonprofit organization, represents nine tree nuts: almonds, Brazil nuts, cashews, hazelnuts, macadamias, pecans, pine nuts, pistachios and walnuts. The INC is dedicated to the support and dissemination of nutrition research and education.

For more information, including recipe ideas, please visit <http://www.nuthealth.org>, or write to:

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BIOTECHNOLOGY THE FAILED MIRACLE

Vandana Shiva*

In the mid-eighties when biotechnology in agriculture started to be commercially developed, it was offered a miracle cure for hunger and the ecological crisis.

However, as we look back from the year 2000, the "miracles" of agricultural biotechnology have actually been a series of failures. And whether looked at from the point of view of the food security of the poor or the environment, biotechnology is deepening the crisis and creating more problems than it solves.

The Flavr Savr Tomato, the recombinant bovine growth hormone (rbgh), the genetically engineered bacteria that would convert biomass into ethanol are all failed miracles. The rbgh was supposed to improve farmers' incomes by producing more milk, the drug was supposed to be safe for cows and the milk was supposed to be safe for consumers. Instead, farmers' incomes went down, cows were suffering from new diseases and the milk had up to five times higher Inulin-like Growth Factor (IGF-1). Research has shown that women with relatively small increases in their blood-levels of

IGF-1 have the chance of developing seven times more post-menopausal breast cancer and high levels of IGF-1 in the blood are the strongest known risk factors for prostate and colon cancer.

The genetically engineered bacteria *klepesilla planticola* was offered as an ecological miracle which would digest farm waste, provide energy in the form of ethanol, and fertiliser in the form of sludge. When experiments were done with the genetically engineered sludge, it was found that the wheat plants died, though the non-genetically engineered bacteria was harmless. The genetically engineered ecological miracle could have been an ecological disaster if it had been commercially applied.

The problem with the biotech miracle is that its products are being prematurely introduced into the market, its promises and benefits are being exaggerated, and its costs and risks are being denied and ignored.

Reductionist Blinkers

The risks of genetic engineering are rooted in the reductionist paradigm

of science which ignores relationships and impacts.

Reductionism in biology is multifaceted. At the species level, this reductionism puts value only on one species, the humans, and generates an instrumental value for all other species. It, therefore, displaces and pushes to extinction all species that have no or low instrumental value to man. Monocultures of species and biodiversity erosion are the inevitable consequence of reductionist thought in biology, especially when applied to forestry, agriculture and fisheries. We call this first order reductionism.

Reductionist biology is increasingly characterised by a second order reductionism - genetic reductionism - the reduction of all behaviour of biological organisms including humans to genes. Second order reductionism amplifies the ecological risks of first order reductionism, while introducing new issues like patenting of life forms.

Reductionist biology is also an expression of cultural reductionism, since it devalues all forms of knowledge and ethical systems

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related to living organisms that are not reductionist. This includes all non-western systems of agriculture and medicine as well as all disciplines in western biology that do not lend themselves to genetic and molecular reductionism, but are necessary for dealing sustainably with the living world.

Genetic engineering is taking us into a second order reductionism because not only is the organism perceived in isolation of its environment, genes are also perceived in isolation of the organism as a whole. The doctrine of molecular biology is modelled on classical mechanics. The central dogma is the ultimate in reductionist thought.

At the very time that Max Planck, Niels Bohr, Albert Einstein, Erwin Schrodinger, and their brilliant colleagues were revising the Newtonian view of the physical universe, biology was becoming more reductionist¹.

While genetic engineering is modeled on determinism and predictability, indeterminism and unpredictability are characteristics of the human manipulation of living organisms. In addition to the gap between the projection and practice of the engineering paradigm, there is the gap between owning benefits and rewards and owning hazards and risks.

When property rights to life forms are claimed, it is on the basis of their being new or novel, and not occurring in nature. But when time comes for the "owners" to take responsibility for the consequences of releasing genetically modified organisms (GMOs), suddenly the life forms are not new. They are natural, and hence safe. The issue of biosafety is treated as unnecessary².

Thus when biological organisms have to be owned, they are treated as not natural; when the ecological impact of releasing GMOs is called to account by environmentalists, these same organisms are now natural. These shifting constructions of "natural" show that the science, on

which genetic engineering is based, which claims the highest levels of objectivity, is actually very subjective and opportunistic in its approach to nature.

A Wall Street Science

There have been two phases for the discussions of risks associated with genetic engineering.

The first phase which we can refer to as the Asilomar phase was when the techniques of recombinant DNA were emerging. This phase was experimental and was based on the use of crippled organisms which were not meant to survive in the environment. The main practitioners during this phase were university scientists and they themselves called for a moratorium on recombinant DNA research.

The second phase was the Wall Street phase when scientists who had developed genetic engineering left universities to start biotechnology firms. During this phase, concerns for safety were denied in the promise of biotech miracles. This phase is now itself undergoing changes.

Genetically engineered organisms (GEOs) are being released for production and consumption on global markets and the small start-up firms are being bought up by the giant chemical corporations. The issues of biosafety and risks in this phase are very different from the days of Asilomar. The main differences are given in the table.

Safety under laboratory conditions for research done by university scientists using crippled organisms is very different from safety under market conditions for production undertaken by transnational corporations using robust organisms.

Laboratory strains of GEOs are not designed to survive in an open environment. Therefore, we cannot justify extrapolation from laboratory data to ecosystems. Further, existing field tests for safety and risk assessment are not designed to collect environ-

mental data, and test conditions do not approximate production conditions that include commercial scale, varying environments and time scale³.

Central to the rushing of biotech applications to the market by Wall Street Science is the fabricated and false principle of substantial equivalence which assumes that genetically engineered organisms are equivalent to naturally occurring counterparts. As a result of the "don't look, don't see" substantial equivalence principle which blocked safety testing millions of acres were put under g.e. crops without any knowledge of their impact on the environment and health.

However, as knowledge of ecological impact is increasing, a reversal is taking place. A 25 per cent decrease in planting is expected in g.e. acreage in USA compared to 1999.

A grand reversal is also taking place in supermarkets where hundreds of food chains and food businesses have declared themselves g.e. free.

NUT ALLERGIES

About 1 in 100 Americans is allergic to peanuts or other nuts, but nearly half of those who've had telltale allergic reactions-itchy mouth, hives, or tightness in the throat-have never consulted a doctor, a new study finds. In addition, fewer than 1 in 10 of these folks has quick access to injectable epinephrine, which is essential to halting a severe reaction, says Hugh Sampson, MD, study co-author, professor of paediatrics and chief of the division of allergy and immunology at Mt. Sinai Medical Center in New York City.

The problem is that if you've ever experienced allergic symptoms after eating nuts, subsequent reactions may be far more serious. In extreme cases, eating a nut can lead to life-threatening anaphylactic shock.



Ecological Risks of Biotech Crops

Environmental benefits were an important part of the g.e. promise. Crops that grow without chemicals are now herbicide resistant and pesticide producing genetically engineered crops have been advertised.

Two applications of genetic engineering in agriculture account for most of plantings and trials-the first is to make crops resistant to herbicides, and the second is to build pesticide producing properties into plants.

Both "herbicide resistant" and "pest resistant" strategies pose major

Research is showing that pollen from genetically engineered crops remain fertile over larger distances than expected. A study showed that even at sites 400 metres away from the transgenic plots, as many as 7 per cent of the seeds were herbicide resistant. At 100 metres, between 8 and 28 per cent of the seeds were resistant⁵.

A study done at the University of Cornell and published in Nature (20 May 1999) has shown that Bt. corn killed Monarch butterflies, dubbed by the press as the "Bambi of the insect world".

on aphids which were fed on transgenic potatoes laid fewer eggs and lived half as long as lady birds on a normal diet⁸.

At the New York University, researchers found that Bt. toxin from transgenic crops does not disappear when added to soils. Unlike natural, Bt., it is not degraded by microbes, nor does it lose capacity to kill insects. The accumulation of these toxins in the soil causes a major threat to soil ecology⁹.

The pollution from transgenic crops is spreading through cross pollination and hybridisation, as well as vertical gene flow through the food chain. No biosafety regulations are designed to stop this genetic pollution.

In India, the buffer zone in genetic engineering trials is a mere 5m. In UK

	<i>Asilomar phase</i>	<i>Wall Stree phase</i>
Main actors	Scientists	Corporations & Investors
Activity	Lab experiments	Large-scale commercial release on global scale
Organisms	Ecologically crippled	Ecologically robust designed to survive in the environment
Decisions	Independent research	Returns based on investment and dependent research

Herbicide resistant crops can create super weeds by the transfer of resistant traits to wild and weedy relatives through hybridisation and cross-pollination. Just as herbicide resistance can create super weeds, pest resistance engineered genetically into plants can create super pests.

A recent study in Switzerland found that lacewings, which prey on corn pests, suffered maldevelopment increased mortality when fed corn borers raised on Bt.maize⁶.

Pollinators such as bees are also affected. When given sugar solutions with protease inhibitors which are

GLOBAL AREA OF TRANSGENIC CROPS BY TRAIT

(Million hectares)⁴

Trait	1997	%	1998	%
Herbicide resistant	6.9	63	19.8	71
Insect resistant	4.0	36	7.7	28
Others	<0.1	<1	<0.1	1
Global total	11.0	100	28.8	100

Source : Clive James, Global Review of Commercialised Transgenic Crops, 1998, ISAAA.

threats to biodiversity and the environment.

Crops designed to produce toxins through genetic engineering for built-in pest control have been found to kill beneficial species and contribute to evolution of resistance in pest.

used to create resistance to insects in transgenic oilseed rape, bees had difficulties in learning to distinguish the different smells of flowers⁷.

Research findings at the Scottish Crop Research showed that lady birds fed

SPECIAL LABELING FOR GENETICALLY-MODIFIED FOODS?

U.S. lawmakers are trying to get another label on foods as an answer to health concerns. In this case, the talk is that a bipartisan group of lawmakers have offered legislation to create special food labels for genetically modified (GM) foods, using the rationale that everybody who eats food made in America deserves to know what's in it.

The Grocery Manufactures of America are concerned that mandatory labeling of GM foods would unnecessarily confuse consumers about the safety of products already deemed safe by federal regulatory agencies. "To require that these foods bear special labeling to distinguish them in a meaningless way from their traditional counterparts would mislead consumers into believing that these products are somehow different or perhaps unsafe".



it is 200m. But UK environment minister, Michael Meacker had to admit that bees, which may fly up to nine kilometer in search of nectar, cannot be expected to observe a "no fly zone"¹⁰.

A study by the National Pollen Research Unit shows that wind can carry viable maize pollen hundreds of kilometers in 24 hours¹¹.

Transgenic pollen was found 4.5 km from a field of GM oilseed rape in the Central England county of Oxfordshire. This was at least 20 times over the limit set by the regulatory agencies¹².

Biological pollution implies that possibilities of producing uncontaminated organic food are destroyed. In 1999, 87,000 packs of organic Cortilla chips worth over 100,000 were recalled and destroyed because they were found contaminated with DNA from transgenic maize¹³.

The Myth of Feeding the Hungry

Feeding the hungry is the most important myth related to biotechnology. However, yields have actually declined in g.e. crops compared to conventional crops.

Bill Christianson, a soyabean farmer in USA who participated in the first conference on "Biodevastation" held at St. Louis, Missouri, the headquarters of Monsanto, says that in Missouri, genetically engineered soya had a five bushel per acre decrease in yield¹⁴.

According to Ed Oplinger, Professor of Agronomy at the University of Wisconsin, who has been carrying out yield trials on soyabean for 25 years, genetically engineered soyabeans had 4 per cent lower yields than conventional varieties on the basis of data he collected in 12 states which grow 80 per cent of US soya¹⁵.

In a study done by Marc Lappe and Britt Bailey, in 30 out of 38 varieties, the conventional soyabeans outperformed the transgenic ones, with an overall

drop in yield of 4.34 bushels per acre, or a 10 per cent reduction compared to conventional varieties¹⁶.

Dr. Charles Benbrook has reported a 6.7 per cent decline in yields in soyabeans engineered to be resistant to Roundup on the basis of 8,200 university based soyabean varietal trials in 1998. According to him.

"If not reversed by future breeding enhancements, this downward shift in soyabean yield potential could emerge as the most significant decline in a major crop ever associated with a single genetic modification"¹⁷.

The yield of Bt. cotton was found to be dramatically reduced in the first Bt. trials undertaken in India.

Consumer Rejection of "Franken Foods"

Genetically engineered soya was the most widespread biotech product in USA and in the global market. In 1997-98, the EU accounted for 27 per cent of US soyabean exports but this had dropped to 7 per cent in 1998-99. The fall was from 81 million bushels to 19 million.

GE Dumping on India

As the biotech industry has faced rejection in Europe and Japan, it is dumping its g.e. products on unknowing Indians without segregation and labelling.

Soyabean exports to India have shot

up by 300 per cent over a year, draining scarce foreign exchange, displacing the biodiversity of oilseed crops such as mustard, linseed, sesame, coconut, groundnut, destroying farmers livelihoods and shutting down oil mills - from the tiny "ghanis" to the large solvent extraction plants. The estimated destruction of livelihoods due to soya dumping is 10 million¹⁸.

Even a disaster like the Orissa Super Cyclone which killed 35,000 people is being used to dump soya and corn on a rice eating population. Of the \$ 6.5 million US aid and relief, \$ 4.5 million is for soya-corn mix, which is not labelled and is probably the rejected g.e. crops that European consumers refused to buy.

In addition to dumping g.e. products on the South, the biotech industry is mobilising development aid to use the public sector as a Trojan Horse to create markets for biotech seeds and crops in the South. The genetically engineered Vitamin A rice is an example of development aid money propping up a failed miracle by using Third World poverty and hunger as justifications.

Vitamin A Rice:

A Blind Approach to Blindness

Genetically engineered Vitamin A rice has been proclaimed as a miracle cure for blindness - "a breakthrough in efforts to improve the health of billions of poor people, most of them in Asia".

NORTHERN EUROPE HIGH ON FLAVONOIDS

Polyphenols, almost ubiquitous in plant foods and beverages, constitute one of the most numerous groups of plant metabolites. They include simple molecules such as coumarins, the 13 classes of flavonoids (numbering over 5000 substances) and highly polymerized compounds such as lignans and tannins. Polyphenols are partially responsible for the sensory qualities of plant foods, such as colon bitterness and astringency. The main polyphenols in legumes and cereals are flavonoids, phenolic acids and tannins, roots and tubers have very low concentration of flavonoids (except onions and licorice); berries are characterized by a high content of anthocyanins, fruits are rich in phenolic acids; citrus are rich in flavonoids with the highest concentration in the skins; nuts are rich in tannins; the polyphenols in oil seeds are mainly phenolic acids. Northern Europeans consume about 25mg flavonoids/day.

More than \$ 100 million have been spent over 10 years to produce a transgenic rice at the Institute of Plant Sciences at the Swiss Federal Institute of Technology in Zurich. The Zurich research team headed by Ingo Potrykens and Xudong Ye introduced three genes taken from a daffodil and a bacterium into a rice strain to produce a yellow rice with high levels of beta carotene, which is converted into Vitamin A within the body.

The rice is being promoted as a cure for blindness. Vitamin A deficiency causes vision impairment and can lead to blindness. According to the UN, more than 2 million children are at risk due to Vitamin A deficiency.

The work in Zurich was funded by grants from the Rockefeller Foundation which had launched the chemical agriculture in Asia through the Green Revolution. In addition, the Swiss Government and the European Community have also supported the research.

It will however take millions more in dollars and another decade of development work at the International Rice Research Institute to produce Vitamin A rice varieties that can be grown in farmers fields.

Is the "golden" rice a miracle that is the only means for preventing blindness for Asia or will it introduce new ecological problems like the Green Revolution did and create new health hazards like other genetically engineered foods?

The genetic engineering of Vitamin A rice deepens the genetic reductionism of the Green Revolution. Instead of millions of farmers breeding and growing thousands of crop varieties to adapt to diverse ecosystems and diverse food systems, the Green Revolution reduced agriculture to a few varieties of a few crops (mainly rice, wheat and maize) bred in one centralised research centre (IRRI for rice and CIMMYT for wheat and maize). The Green revolution led to massive genetic erosion in farmers fields and knowledge, erosion among

farming communities, besides leading to large-scale environmental pollution due to the use of toxic agrichemicals and wasteful use of water.

Genetically engineered rice as part of the second Green Revolution is repeating the mistakes of the Green Revolution while adding new hazard in terms of ecological and health risks.

The "selling" of Vitamin A rice as a miracle cure for blindness is based on blindness to alternatives for removing Vitamin A deficiency and blindness to the unknown risks of producing Vitamin A through genetic engineering.

Eclipsing Alternatives

The food deficiency of genetically engineered rice to produce Vitamin A is the eclipsing of alternative sources of Vitamin A. Per Pintripe Anderson, Head of the International Rice Research Institute, has said that Vitamin A rice is necessary for the poor in Asia, because "we cannot reach very many of the malnourished in the world with pills".

However, there are many alternatives to pills for Vitamin A supply. Vitamin A is provided by liver, egg yolk, chicken, meat, milk and butter. Beta-carotene, the Vitamin A precursor is provided by dark green leafy vegetables, spinach, carrot, pumpkin, mango and drumstick.

Women farmers in Bengal use more than 100 plants for green leafy vegetables.

The lower cost, accessible and safer alternative to genetically engineered rice is increase in biodiversity in agriculture. Further, since those who suffer from Vitamin A deficiency suffer from malnutrition generally, increasing the food security and nutritional security of the poor through increasing the diversity of crops and diversity of diets of poor people who suffer from the highest rates of deficiency is the reliable means for overcoming nutritional deficiencies.

Sources of Vitamin A in the form of green leafy vegetables are being destroyed by the Green Revolution and Genetic Engineering which promote the use of herbicides in agriculture. The spread of herbicide resistant crops will further aggravate this biodiversity erosion with major consequences for increase in nutritional deficiency. For example, bathua, a very popular leafy vegetable in North India, has been pushed to extinction in Green Revolution areas where intensive herbicide use is part of the chemical package.

Environmental Costs of Vitamin A Rice

Vitamin A from native greens and fruits is produced within irrigation and wastage of scarce water resources. Introducing Vitamin A in rice implies a shift from water conserving alternatives for Vitamin A to water intensive system of production since so-called high yielding rice varieties are highly water demanding. Vitamin A rice will therefore lead to mining of ground water or intensive irrigation from large dams with all the associated environmental problems of water-logging and salinisation.

Further, as in the case of other genetically engineered crops, rice with Vitamin A will have impact on the food web. The ecological impact on soil organisms and other organisms dependent on rice in the food chain should be part of the

THE FRENCH ON VITAMIN E

Vitamin E may protect against age-related macular degeneration, the leading cause of blindness among older people, reports the Archives of Ophthalmology. Researchers in France who studied 2,500 adults aged 60 and older, found that patients with high body levels of vitamin E were 80 percent less likely to show AMD symptoms. Nuts are very high in Vitamin E.



biosafety analysis of genetically engineered rice before it is released for production. Research has already shown that indigenous rice varieties support far more species than Green Revolution varieties. How will genetically engineered rice impact biodiversity and the potential for disease and pest vulnerability?

of Vitamin A, especially among those who do not suffer from Vitamin A deficiency. Excess Vitamin A can lead to hypervitaminosis A or Vitamin A toxicity. Such toxicity is known to occur due to over-ingestion of Vitamin A rich food e.g. Polar bear liver or by food faddism by over-solicitous parents, or as side-effects of inappropriate therapy.

occur after ingestion of large quantities of Vitamin A for protracted periods. Chemic toxicity is characterised by bone and joint pain, hyperotosis, hair loss, dryness and fissures of lips, a noxeua intraeranal hypertension, low grade fever, pruritis, weight loss, hepatosplenomegaly.

While plant sources of Vitamin A do not usually cause Vitamin A toxicity, since genetically engineered Vitamin A in rice is not naturally occurring, it cannot be assumed to be substantially equivalent of Vitamin A occurring in plants naturally. Safety of genetically engineered Vitamin A need to be tested. It cannot be assumed.

Natural sources of Vitamin A are consumed seasonally and in small quantities as greens, relishes, fruits and hence do not carry the risks of Vitamin A toxicity. Rice eating regions have been found to be associated with higher malnutrition than wheat eating regions, especially after the Green Revolution which detroyed fish and plant biodiversity necessary for a balanced diet. These regions also have higher prevalence of water borne diseases like diarrhoea, amoebiasis, hepatitis A and E, dysentery and vector borne diseases like malaria, which is increasingly becoming falciparum malaria. These health problems are known to involve damage to the liver. The additional risks of Vitamin A toxicity under these conditions of vulnerable health situation of the poor in Asia needs to be assessed with care before a large-scale push is given to genetically engineered rice.

Further, the globalisation of agricultrre is leading to an increase in malnutrition in the Third World, as the most fertile ecosystem are diverted to luxury export crops, and as domestic markets are destroyed due to dumping of subsidised agricultural commodities. In India, per capita consumption of cereals has declined by 12 per cent in rural areas over the past two decades. The shift from policies based on the "right to

1999 SAW A REVERSAL OF BIOTECH FORTUNES

- 16 March Marks and Spencer announces to remove GM ingredients from its own-brand products.
- 17 March Sainsbury's announces to follow suit
- 18 March Sainsbury's and Marks and Spencer form a consortium with other European food retailers - such as Carrefour in France and the Irish Superquinn chain - to source non-GM products.
- 21 March Iceland announces increased profits. This is widely linked to their position on GM foods.
- 14 April Tesco, the UK's largest food retailer, insists it has no plans to ban GM food.
- 28 April Tesco bans GM ingredients in its own-brand products.
- 28 April Unilever, owner of Birds Eye Walls and Van den Burgh Foods, bans GM ingredients
- 29 April Nestle goes GM free.
- 30 April Cadbury joins in to make UK chocolate GM free.
- 20 May The Federation of Bakers confirms that GM ingredients are not used by British bread makers.
- 8 June Northern Foods, whose chairman Lord Haskins is an advisor to the Prime Minister, grudgingly bans GM ingredients.
- 12 June McDonald's goes GM free joining Pizza Express and Domino Pizza. Other fast food chains on the way to removing GM ingredients include Wimpy, City Centre Restaurants (who own Cafe Unō, Garfunkels, Deep Pan Pizza Co, and Cafe Metro), Perfect Pizzas and Pret a Manager.
- 19 Sept. Blake Bros, the UK's larget frozen food distributor, bans GM ingredients.
- 13 Dec. Iceland becomes the first retailer to ban GM feed for its poultry.
- 20 Dec. Tesco announces to phase out the use of GM of ingredients in animal feed.

Source: Gene Watch, briefing Number 9, January 2000, UK.

Health Risks of Vitamin A Rice

Since rice is a staple diet eaten in large quantities in Asian societies, Vitamin A rice could lead to excessive intake

Vitamin A toxicity can lead to abdominal pain, nausea, vomiting, dizziness, popillidena, bulging fontanelle.

Chemic toxicity of Vitamin A can



food" to free trade policies will push millions into hunger and poverty.

Genetically engineered rice is part of a package of globalised agriculture which is creating malnutrition. It cannot solve the problems of nutritional deficiency but can introduced new risks of food safety. Since the Vitamin A in rice is not naturally occurring and is genetically engineered, novel health risks posed by Vitamin A rice will need to be investigated before the rice is promoted by IRRI and aid agencies or commercialised.

The risk assessment for living modified organisms intended for direct use as feed is given in Annexe II of the recently finalised Biosafety Protocol under the Convention on Biological Diversity.

The risk assessment of Vitamin A rice should therefore involve the following steps:

- (a) An identification of any novel genotypic and phenotypic characteristic associated with the Vitamin A rice that may have adverse effects on biological diversity in the likely potential receiving environment, taking also into account risks to human health.
- (b) An evaluation of the likelihood of these adverse effects being realised, taking into account the level and kind of exposure of the likely potential receiving environment.
- (c) An evaluation of the consequences should these adverse effects be realised.

The risk assessment also needs to take into account the vectors used, the insects, the ecological differences between transgenic Vitamin A rice and conventional rice varieties. The diverse contexts in which the rice is to be potentially introduced also needs to be taken into account. This includes information on the location, geographical, climatic and ecological characteristics, including relevant information on biological diversity and centres of origin of the likely potential receiving environment.

It is these potential risks that have put a question mark on genetic engineering in agriculture. The genetically engineered Vitamin A rice is now being used as a Trojan horse to push genetically engineered crops and foods.

Pinstrup Anderson, the IRRI Director has suggested that the Vitamin A rice could provide a public relations boost for plant biotechnology, which has been criticised by some environmentalists and consumer activists for promoting "Franken foods". It has yet to be established that genetically engineered rice is not a Franken food.

But one thing is clear. Promoting it as a tool against blindness while ignoring safer, cheaper, available alternatives provided by our rich agrobio-diversity is nothing short of a blind approach to blindness control.

Uncertain future of Biotechnology

While ecologically irresponsible spread in acreage and socially irresponsible dumping of biotech products was the trend in the past,

the "free-trade" regime in biotech products will now have to change.

The biotech industry failed to bring biotech into the WTO free trade regime in Seattle. And in spite of a decade of hurdles and blockades, the Biosafety Protocol was finally concluded in Montreal in January 2000.

Labelling, segregation, risks assessment and management, the precautionary principle, advanced informed agreement will now be legally binding obligations on the biotech industry.

For more than a decade, the industry manipulated not just biological organisms but also environmental and safety regulation. It engineered crops and it engineered law and policy to be immune from risk and safety assessment, to privatise gains and socialise costs.

It is now time for the biotech industry to face the text of ecological and social accountability and responsibility.

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Source : FOCUS, WTO



India. The Cashew Country:



Welcome to the land of surprises

The Land

Karnataka is a land of enriched heritage, culture, natural beauty, arts and its people. Snugly located on the Deccan Plateau the state is an emerald on the Indian Peninsula. At about 610 mts average height above sea level Karnataka's climate is almost moderate though widely varying at different places.

For centuries Karnataka was ruled by powerful dynasties like the Hoysalas, Rashtrakutas, Chalukyas, the great Vijayanagara kings and the Bahmani kingdom. All of them to one purpose—own the fabulous land of sandalwood, jasmine, gold and silk forever.

Some of friendliest people in world, they receive visitors with a great deal of warmth. They are always willing to share their glorious culture to the discerning tourist. An alluring stretch of Arabian sea coastline, dark and majestic rocks of the Deccan, crystal clear waters of Cauvery, awesome grandeur of temples and monuments, lush tropical forests abound with wild life, bustling and sophisticated Bangalore, big hearted people, regal tradition and innumerable species of flora and fauna make Karnataka an intoxicating amalgamation, of the best things nature and man has to offer!.

Any kind of venture a tourist wishes to undertake is fructifying

here. Swimming, surfing, scuba diving, fishing, canoeing, rafting, rock climbing, trekking, golfing, and any other endeavour here is a suitable haven with all the facilities in the world. An unforgettable and ecstatic experience awaits indulgence.

Its Trendy Towns

Yes, Karnataka is a state of charming contrasts, with the modern blending harmoniously with the traditional. The hustle and bustle of industries nestling comfortably with the easygoing relaxed pace of life with some of the most magnificent monuments, temples, and palaces of the country.

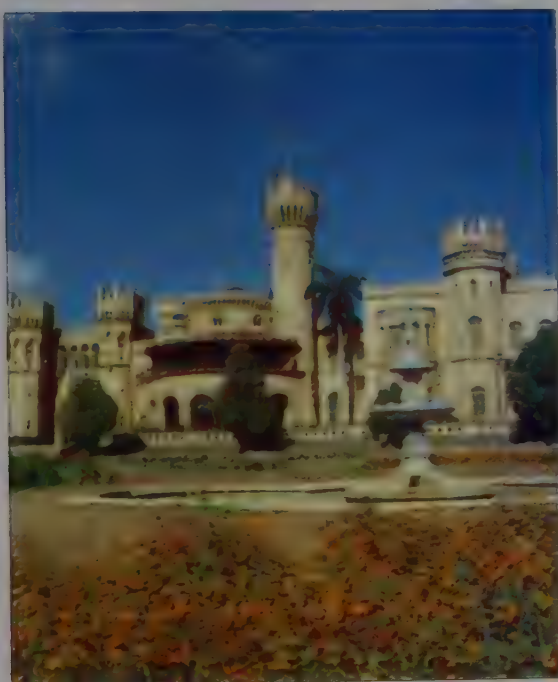


Bangalore

Located 1000 m above the sealevel , the capital city of Karnataka, has a perpetual holiday atmosphere. Bangalore is famous as the Garden city, air-conditioned city and now the silicon valley of India. Amongst the most beautiful cities in the country it is famed for its 'picnic-weather', silk and sandalwood shopping .

Founded in 1537 by a local chieftain Kempe Gowda, Bangalore has seen much and imbibed even more. Rapid industrial growth has not taken away Bangalore's old -world charm.

Vidhana Soudha .It houses the State Legislature and Secretariat. *Vidhana Soudha* was conceived and executed by Kengal Hanumanthaiya, then Chief Minister , in 1956. It is built entirely in Bangalore granite in the Neo-Dravidian style. Its harmonious blend of architectural beauty of and practicality conveys the attitude of the city itself.



Bangalore Palace

Directly opposite it stands the Gothic structure of the **Attara Kacheri** which houses the State High Court. This building was completed in 1868 and stands in the green splendour of the **Cubbon Park** laid out in 1864 by Lieutenant General Sir Mark Cubbon, now functions as the lung space for the city. Within walking distance are the **Public Library, the Government Museum, the Visvesvarayya Industrial and Technological Museum** and the **Venkatappa Art Gallery**.

Lalbagh Gardens, laid out in 1760 by Hyder Ali which has an area of 240 acres is the epitome of the city famed for greenery. With India's largest *Floral Clock* and a *Glass house* inspired by the *Crystal Palace* in London, it is truly a nature lovers paradise.

The Bangalore Palace, built in 1887 by a Wodeyar king, nestled in acres of greenery reminds one of Windsor Castles. The Tudor style construction of the Palace gives it a fairy tale appearance. **The Nandi Temple** is one of the oldest temples in Bangalore and the celestial Nandi-the Sacred Bull, here is the third largest such statue in the country, has been carved out of single boulder and is 4.6m tall.

The **Ulsoor lake** in the heart of the city extends over an area of 1.5 sq.km. Dotted with small islands it is an attractive lake for boating.

Mangalore

357 km. west of Bangalore is the seaport town of Mangalore. A cosmopolitan city, influenced by Bombay, it is a major commercial centre. Mangalore could be your entry point to Beach Country -with its pristine and unexplored beaches. Mangalore the headquarters of the South Canara district, is a quaint mixture of the old charm and modern sophistication. With an ancient history of marine trade, the fully equipped port has helped Mangalore develop into a business and commercial centre. The town houses many prestigious educational institutions of the state.

Tile roofed buildings surrounded by coconut groves and the gentle ocean breeze mixed with the sweet the odour of Mangalore jasmine creates a wonderful atmosphere. Just a few minutes drive from the town will take you to lovely beaches. **Kadri hills** has some delightful caverns where children love to play hide and seek.

The 10th century Manjunath temple reminds you of the ancient Chola temples. You cannot afford to miss **St.Aloysius Chapel** with paintings of Moschemi. The 1000 pillar Jain shrine is situated in **Moodabiri** which is just

35 kms. from the town. At **Karkala** there is a 15th century Jain centre with a 12.8m high monolith of Gomateswara. It is 52 kms away from the town.

The **Italian Jesuit monastery, Tippu Sultan's battery, Juma Masjid, Someshwar temple** and **Syed Madani's Dargah** are also very interesting places to be visited. **Pilikula Nisargadhama**, an integrated park for tourists is also at easy reach.

Belgaum is another important town. It is the gateway to Karnataka from Goa and Bombay. A major commercial and educational centre in the state. Belgaum has many places of historical , cultural and architectural, interests. Bellary, Bijapur, Chikmagalur, Dharwar, Gulbarga, Hassan, Karwar and Shimoga are the other important towns as district headquarters.

Glory of Its Golden Past

The singing stones of yore tell the stories of the golden past. There is a song in every bit, rhythm in every facade, intricacy in every carving and every idol sings an ode to the opulent past. This is the Royal Heritage of the Karnataka which has been home to dynasties ranging from Hoysalas, Rastrakutas, Chalukyas and more. This part of the country covers some of the 'one of a kind' stone architecture that are simply incredible. It displays the influence of each of these kingdoms including the moghuls. The poetry that's relived on stone dots the horizon as standing evidences of the glorious past. The land of monuments welcomes you. Its richness deserves more than elegies.

Mysore

The royal city of Wodeyars. Steeped in history it is a city that has made the 'Dasara' festival its very own. The Maharaja's Palace in Mysore is a jewel of a structure that is an inspired example of Indo-Saracenic architecture. Lit up with a thousand lights during "Dasara", the palace draws crowds by



Mysore Palace

the thousands to see the jewel studded golden throne on display then.

The Art Gallery in what originally was the Jaganmohan Palace, that dates back to 1875. Paintings by Raja Ravi Varma, Svetoslav Roerich and the traditional Mysore 'gold leaf' paintings and other articles collected by the royal family form the core of the beautiful collection here.

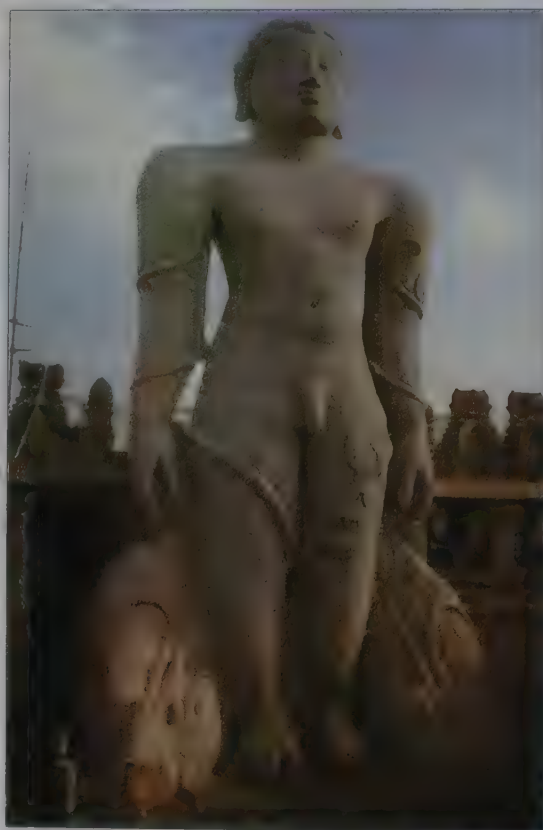
St. Philomena's Church, in the Gothic style, is one of the largest churches in the country and has exquisite stained glass windows. Chamundeswary the patron goddess of the royal family is perched atop the **Chamundi Hill**, a 12th century temple. Gigantic statues of the demon *Mahishasura* and the Sacred Bull *Nandi* are also situated on the hill. The town also has a zoo that houses some rare animals.

Srirangapatana. The island fortress that was once the capital of the Warrior-kings Hyder Ali and his son Tipu Sultan, the *Tiger of Mysore*, is just 14 kms. away from Mysore on the Mysore-Bangalore highway. Tipu's summer palace, **Daria Doulat**, built in 1784 was his favourite retreat. It is now a museum and tells eloquently of his valour and his losing battle against British expansion. It is ornate with beautiful frescoes. Tipu's Fort at in joyful exuberance. K.R.S Dam and Brindavan Gardens with its ornamental terrace gardens and the fountains dancing to the rythm of slow music attracts thousands of visitors. At **Kanchinakote**, there is fabulous ruins of old port built in by Gangaraja of Shivasamudra.

Belur. Belur is known as the Southern Banaras by virtue of its exquisite temples. The star shaped main

structure of the **Chennakeshava Temple** carved entirely out of black stone, displays a metallic sheen. It is one of the finest examples of Hoysala architecture. It took 103 years to complete and you can see why. The facade of the temple is filled with intricate sculputures and friezes- with no place left untouched. The **Veeranarayana Temple** and the smaller shrines also are well worth a visit.

Shravanabelagola. About 50 km. from Hassan, this is one of the most important Jain pilgrim centres with the 18m. high monolith of Lord Bahubali, said to be the world's tallest monolithic statue. The



Statue of Bahubali

'**Mahamastakabhisheka**' - a spectacular ceremony -held once in 12 years- when the 1000 year old statue is annointed with milk, curds, ghee, saffron, holy water, turmeric paste, sandalwood paste and gold coins.

Halebid. What astounds one about the **Hoysaleswara Temple** here is the wealth of sculptural details. The walls of the temple are covered with an endless variety of gods, goddesses, animals, birds, and sensuous dancers. Yet no two facets of the temple are the same. The magnificent temple -guarded by *Nandi*, the Sacred Bull - was never completed, despite 86 years of labour.

Bijapur. The **Gol Gumbaz** with its 44 metre diameter dome is the focus of attention in Bijapur. The tomb of Mohammed Shah lays claim to the largest dome in Asia. The interior of the dome, mysteriously unsupported, has a whispering gallery under it, whose acoustics is so magnificent that the ticking of a clock could be heard across the length of the structure.

Ibrahim Roza. The mausoleum of Ibrahim Adil Shah, this structure with its elegant minarets is said to have inspired one the wonders of modern world - The Taj Mahal in Agra.

Juma Masjid. Amongst the finest mosques in India the Juma Masjid of Bijapur displays verses of the Quran in letters of gold and covers a total of 1,16,300 sq.ft.

The Malik-e-Maidan. Means the Master of the Field, this cannon is 14 feet long and weighs around 55 tons. This magnificent specimen of the armours' art is the largest of its kind.

Aihole, Pattadakal, and Badami. Standing close to one another within a 13 km radius, these temple towns represent Chalukyan architecture at its best.

Aihole. The 'cradle of Indian architecture' has 125 temples -intricately carved rich in detail -to justify its title. The oldest temple is perhaps the 5th century **Lad Khan Temple**.

Pattadakal. A World Heritage Centre, it has 10 major temples representing early Chalukyan architecture. The biggest temple, dedicated to Virupaksheshvara, has a huge gateway and several inscriptions.



Gol Gumbaz

Badami .Picturesquely situated, Badami has four cave temples. Overlooking them is a reservoir, its banks dotted with temples dedicated to Vishnu and Shiva.

Hampi . The tiny hamlet was the erstwhile "City of Victory". The capital of the great Vijayanagara kings, it today consists of 9 sq.miles of fabulous ruins, fortification and outposts. Carvings on rock that stand out by their sheer beauty embellish the walls of the Hindu temples here. The Narasimha - the half man-half lion incarnation of Lord Vishnu, Shivalinga, and Ganesha monoliths are simply awesome in grandeur. The massive **Vitthala temple** houses musical pillars and **the Stone Chariot** that appears as if a real chariot that got the glimpse of Medusa. Hampi is full of delightful surprises. Like the **King's Balance** where Kings were weighed against grain, gold, or money which was then distributed to the poor. **The Queen's Bath** with its arched corridors, projecting balconies and lotus shaped fountains that once sprouted perfumed water, the two storied **Lotus Mahal** with recessed archways, the huge **Elephant Stables**, the Virupaksha Temple, still used for worship, **Ugra Narasimha** - the 6.7 m. tall monolith, the **Pushakarini**, the **Mahanavami Dibba** and so much more. At its golden times Vijayanagara empire was compared to Rome by the Portuguese traveller Paes. Hampi has been declared as a World Heritage Site and special measures are taken to protect it.

Chitradurga .A quaint town on the Highway linking Hospet to Bangalore has a famous Fort. This marvel of military architecture - made impregnable by the Nayak Paleyagars has 19 gateways and 38 postern entrances.

Gulbarga. The **Dargah of Bande Nawaz**, the great sufi saint, and the **Shrine of Sharana Basaveshwara** are two important places worth mentioning. The **Gulbarga Fort** has within it, the **Jumma Masjid**, modelled on the great mosque of Cardova in Spain.

Bidar .The capital of the Bahmani kingdom and later the Barid Shahi

dynasty, it has a 15th century Fort. The Muhammad Gawan '**Madrasa**' and the tombs of the Bahamani and Barid kings deserve a visit. Bidar is famous for 'bidriware' a distinct and exquisite craft of this district.

Bhatkal .A historical township. This ancient port town has temples of Vijayanagara times and many interesting Jain monuments. Nearby is the scenic holy place of **Murdeshwar**.

Gokarna. Gokarna means the cow's ear. This town is formed by the ear-shaped confluence of two rivers. It also has the famous **Atmalinga** in the ancient temple here.

Banvasi. A temple town mentioned in the Indian epics, the Ramayana and the Mahabharatha. It is 140 kms away from Karwar. Other places of interest in Karwar are the historical **Sadashivagad Hill fort**, the **Dargah of Peer Shah Shamsuddin** and the **Octagonal church** at Sunkeri. At Honnavar, there is a fort of the Portuguese times in the middle of the sea.

Its Wonderful Wildside

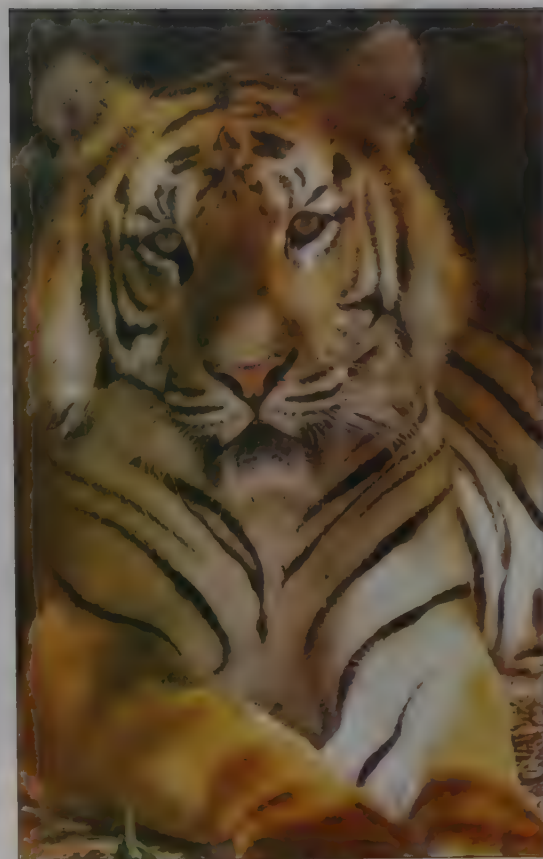
Welcome to the wonderful wildside of Karnataka The morning sun filters through the trees and sets off in a theatrical ambience on the forest floor with a fine blend of green and black shades alternated by the rich crimson light.

A comfortable stay in the jungle lodges enable you to sleep literally in the lap of mother nature in all her wild glory. Yes, step into the land of rugged exuberance, wake your senses, you are in the thick of it.

Bandipur

Bandipur National Park and Tiger reserve. One of the fifteen selected across the country for Project Tiger, a scheme launched in 1973, by WWF to save the tiger from extinction, which has doubled the Tiger population in Bandipur.

Peafowl, Patridges, Quail, Hornbill, Giant Squirrel, Dhole (Wild Dog),



Tiger at Bandipur National Park

Elephants, Sambar, Barking Deer, and many other rare species exist here.

Trees like Rosewood, Honne, Alathi, Bamboo, and Sandal is grown in abundance here.

Elephant rides in the park is a memorable experience. You can avail the facility of the rest houses and cottages of the Karnataka Forest Department and the Karnataka State Tourism Development Corporation.

Distance: 80 kms from Mysore. 217 kms from Bangalore.

Best time to visit : June-October.

Nagarhole National Park

Located in Coorg and Mysore districts, **Nagarhole National Park** is rated as one of the best sanctuaries of the world. You can explore the wild on elephant back or jeeps. Nagarhole is a delightful spot with some of the world's most magnificent creatures. Four Horned Antelope, Panther, Warblers. Hornbills, Spotted Deer, Mouse Deer, Pangolin, Gaur and Giant Flying Squirrels inhabit these parts.

There are also some friendly tribes with their colourful life-styles like Jenu Kurubas (honey gatherers), Betta Kurubas (hill tribes), and the Hakki Pikki (bird catchers) living in these forests.





Elephants

There are fabulous jungle lodges and cottages right in the middle of the jungle.

Distance: 96 kms from Mysore.
236 kms from Bangalore.

Best time to visit: June-October.

Kabani

Kabani River Lodge provides a breathtaking view. Patches of bright blue pools, green trees of varying heights, and animals roaming free. If you dare to take a walk in the forest, you are bound to take home some unforgettable memories. If you are lucky enough, you can catch some elephants, leopards, antelopes or may even spot a tiger couple in your camera.

You can also hire a tent and spend a night in the jungle.

Bhimeswari

Bhimeswari has an abundant wild life ecosystem with Elephants, Deers, Boars, Monkeys, Jackals, Crocodiles,



Deer Park

Otters, and even Leopards. Birds like Heron, Ibis, Cormorant, and Kingfisher.

River Cauvery abounds with many varieties of fish. Cauvery **Fishing Camp** at Bhimeswari is a paradise for anglers and gives them a chance to try their luck in fishing. It is a natural habitat for the finest game fish- Masheer, that weighs 100 lbs and fights like a tiger.

Tented camps with bonfires light up the nights making the surroundings all the more mysterious.



Cauvery Fishing Camp

Chikmagalur

About 250 kms from Bangalore is the town of Chikmagalur, with Baba Budan mountains overlooking it. The Chikmagalur district is full of scenic surprises. Hills, valleys, streams, and snow white coffee blossoms. Of course a trekkers territory. Kemmanagudy a scenic hill-station is just 50 kms away.

Bhadra Wildlife Sanctuary

Located in Chikmagalur and Shimoga districts, Bhadra is one of the most fascinating sanctuaries. The great Indian Gaur, Barking Deer, Flying Fox, Mongoose, Elephants, Panthers, Macaque, Bulbuls, Barbets, Blue Jay, Kingfisher, Robin, Weaver, Drongo and many other exotic creatures have made Bhadra their home. This luscious green sanctuary is spread over 500 sq.kms.

Bhadra offers accommodation in the form of cottages and tented camps.

Distance: 185 kms from Hassan.
257 kms. from Bangalore.

Best time to visit : November - March.

Kundermukh National Park

This National park is the third largest sanctuary in Karnataka, which is spread over 600 sq.kms of lush green area. Lion-tailed Macaque, Tigers, Leopards, Gaur and many varieties of birds are found here in plenty.

Kundermukh National Park is located in the Chikmagalur district. Kundermukh is the second largest peak in the western ghats. All you need is just one day of trekking and you will know why trekkers are so frequent in this place. You will need 8-10 hours of trekking from the road head to reach this range. 'Mullayanagari' another fascinating place of the same Baba Budan range offers you all the facilities that could be expected of a wild and adventurous holiday.

Best time to visit : September -May.

Ranganathittu Bird Sanctuary

This bird sanctuary is paradise for wildlife enthusiasts. One look around and a host of surprises await you. It allows a close view of birds, both exotic and familiar and crocodiles that resembles mud banks. Flocks of some of the world's rarest birds on tiny islands. Birds from Siberia,

Australia, and even North America have made this a haven for seasonal habitats. When you hit the water on cane-boats, you get a close look of some spectacular creatures like Ibis, Egret, Heron, Partridge, or even the Cormorant.

Distance : 18 kms from Mysore.
125 kms from Bangalore.

Best time to visit : June-October.

Shivasamudram

It is 85 kms east of Mysore, where the river Cauvery cascades down in two picturesque waterfalls. Falling 250 ft down into rocky gorge, these falls are best during the monsoon months. 1.5 km away is a hundred years old hydroelectric project which is the first of its kind in Asia.

Biligirirangana Hills (B. R. Hills)

The B.R.Hills are situated between the Cauvery and Tungabhadra rivers. A stretch of over 16 kms. and height of 5,100 ft, this place has it all for sheer, wild entertainment, Just in one night you will become familiar to the roar of tiger. Is that not close enough to nature!.

Biligiriswami Temple Sanctuary

Spread across 540 sq.kms.of wildness this sanctury has many rare species of animals like Gaur, Chital, Sambar, Bears, Elephants, Panthers and Tigers roaming in the forest without a bother about the rush and roar of the 'wild civilizations'. You can enjoy the serenity of the temples amidst the thick forests or join the Soliga tribe dancing to a brisk tune.

You can make yourself cozy in tent camps and rest houses near the sanctuary.

Distance : 120 kms. from Mysore.
247 kms from Bangalore.

Mercara (Madikeri)

5000 ft. above sealevel lies Mercara, called locally as Madikeri, the district headquarters of Coorg (Kodagu).

On your way to Madikeri, smooth roads dip, rise, loop and curl around lovely coffee plantations. You find delightfully manicured coffee plantations rising upto the sky on one side and sloping down on the other. The weather gets chillier by the minute and a strange twilight descends soothing your fatigued soul.

The British called Madikeri, the Scotland of India. Madikeri is home to the supposed descendents of Greeks, the Kodavas. Proudly independent, good looking, and powerful martial Kodavas retain the privilege of carrying fire arms without a license. This place is also famous for the generals it has produced for the Indian army. Kodavas are famous for their hospitality and colourful culture.

Abbey Falls. Just a few kilometres from Madikeri, water cascades down in steps and flows down like a small river. These falls are surrounded by luscious green hills all around and is a great place to explore by foot.

Another lovely waterfall on the way to Kutta from Gonikoppal is there, named **Irupu falls.**

Harangi. A reservoir close to Kushalnagar is one of the biggest in the state and from the highest point provides a breathtaking view of water beneath and the hills beyond.

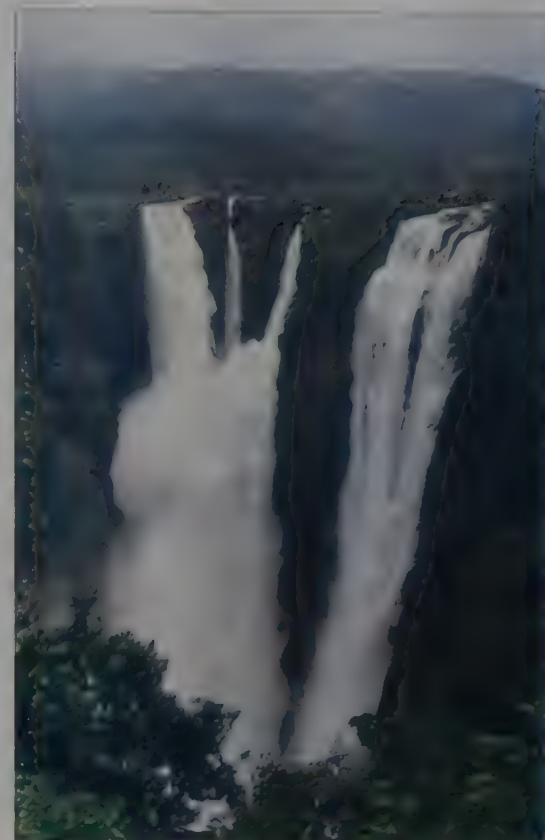
Cauvery Nisargadhama. A beautiful island surrounded by Cauvery stream is connected by a hanging bridge to the main land. Lodging in cottages, coffee houses and deer park are some other attractions there.

Raja's Seat. Should not miss the scene of the sunset, from the Raja's Seat, where the Kodagu kings used to spend their evenings.

Bhagamandala. Some 40 kms. from Madikeri is Bhagamandala, where three rivers join. Nearby there is a temple which give perfection to the serenity of the scene. 45 kms. away from Madikeri is **Talacauvery**, the source of holy river Cauvery.

Jog Falls

60 kms. from Honnavar, a hamlet of Kargal village is a famous spot Jog,



Jog Falls

known for its magnificent waterfalls. River Sharavati takes a leap from a height of 970 ft. in four parts known as Raja, Rani, Rover and Rocket. The falls are at their impressive best during the months of June to November. It is the highest waterfall of the entire subcontinent. Accommodation is available around the place and is an ideal spot for water sports.

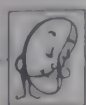
Agumbe

About 70 km south to Shimoga is Agumbe, the place that receiving the highest rainfall in the state. Situated on a ghat head, this place offers a fabulous sunset which is the main attraction of the place. Gopalakrishna temple and Observatory are the other places that worth a visit.

Just 10 kms. from Shimoga is **Tyavarekoppa**, a place provided with lion and tiger safari.

Kollur

80 kms. from Udupi is Kollur. It has the attractive Mookambika temple at foot hills and is surrounded by Green Hills. Around is Mookambika Wildlife Sanctuary, with abundant varieties of species like tiger, sloth bears, lion-tailed macaque, chital and many types of flora and fauna. Not very far from Kollur is **Arasina Makki**, a magnificent waterfall.



Dharmasthala

75 kms from Mangalore is Dharmasthala. It has the temple of Lord Manjunatha. River Nethravati flows through the place and is known for its aquatic creatures present in this area.

Subramanya

About 100 kms from Mangalore, Subramanya is set amidst captivating hills. The river Kumara Dhara flows through this peaceful resort. The deity worshipped in the temple here is Karthikeya in the form of a cobra.

Bendra Theertha

65 kms away from Mangalore and 15 kms from Puttur is the natural hot water spring of Bedre Theertha. A dip in this spring is said to cure skin diseases. It is situated in a scenic spot by the side of river Seerehole.

Dandeli Wildlife Sanctuary

125 kms north-east is Dandeli Wildlife Sanctuary, which is the second largest sanctuary in Karnataka. It has an area of around 840 sq.kms. The important species of animals seen in plenty here are elephants, tigers, sambar, chital, and wolves. The months between December and May are the best time to visit.

Magod Falls

Nearly 150 kms away from Karwar is Magod, a magnificent waterfall, where river Bedti cascades down to 180 metres and presents an unforgettable spectacle.

Bannerghatta National Park

Just 20 kms from Bangalore is Bannarghatta National Park. It offers the opportunity to visit crocodile farms and go on a Lion and Tiger safari. A giant banyan tree that extends over 3 acres is an attraction at *Ramohalli*.

Nandi Hills

60 kms North to Bangalore is Nandi Hills, a smart hillstation, one of summer retreats of the Tiger of

Mysore - Tipu Sultan. Tipu's Drop - a 600 metre high cliff-face offers a magnificent view.

Mekedatu

About 100 kms south to Bangalore is Mekatu, meaning a 'Goat's leap' in the local language, is a beautiful picnic spot, where river Cauvery squeezes through a narrow gorge.

Its Beautiful Beaches

The enchanting strip of land elevated into the Arabian sea is the western frontier of Karnataka coastline. *Karavali* (the coastal Karnataka) is a rich cocktail of palm groves, white sands, calm and clean beaches, greenish blue waters and colourful culture. Various other endeavours to be undertaken, exist all along the stretch, leading you to think of a permanent settlement on this veritable paradise.



Karwar Beach

Ullal Beach

Just a few minutes easy drive from Mangalore and you encounter the lovely beaches of Ullal. On the silvery beaches with the swinging palms, you are guaranteed a bagful of shells for memory.

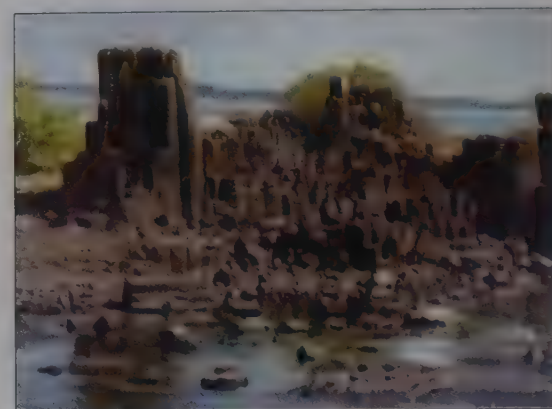
Malpe Beach

6 kms from Udupi is Malpe, an exquisite beach that is a picture perfect picnic spot. The unspoilt beach is an enormous stretch of golden sand, palm glades, azure sky and a friendly sea.

Partially visible from Malpe beach you can sail off to *St.Mary's Island* on a boat. Massive columns of basalt rock with the sea gurgling nearby makes this an ideal holiday spot.

Kapu Beach

About 10 kms from Udupi towards Mangalore is the awe-some Kapu beach. White sands with black, stark rocks scattered at random and a very tall lighthouse adds to the beauty of the beach. The sea is sometimes harsh and waves slam the rocks with great ferocity with a large spray that is a real treat to anybody's eyes.



Kapu Beach

Maravanthe Beach

After 50 kms north of Udupi, the highway is all of a sudden converted into a natural ramp with the Souparnika river on one side and a backdrop of hills and lovely beach on the other that just invites you to run and take a plunge. That is Maravanthe beach. The drive is an out-of-the world experience. If you have a passion for the shells, it is found in abundance here. The sunsets are not to be missed.

Karwar

Northernmost tip of Karnataka coastline, Karwar is a natural harbour, protected by five islands. This picturesque beach is said to have inspired the great Rabindranath Tagore to write his first play.

The *Pigeon Island*, off the Murdeshwar coast is a really nice place that is worth a visit. The beaches at Gokarna, Bhatkal and Murdeshwar are beautiful and thankfully unspoilt.



Its Fascinating Festivals

Karnataka is a land of festivals. It has many colourful festivals, that come throughout the year. Karnataka has been a cradle of Indian classical music and dance. *Karnatic Music*, one of the two main streams of Indian classical music, is rich with more than 5000 defined compositions called Ragas. Yakshagana is an elaborate night-long dance-drama unique to Karnataka. Colourful costumes, loud rhythmic percussions and entrancing dances make *Yakshagana* performances very arresting.

Ugadi is the festival celebrated around Karnataka, at the beginning of the year, according to the local calender. *Dassara in Mysore*. The Maharaja's Palace will be lit up with a thousand lights during the ten-day long festival in October-November every year. The celebrations are reminiscent of the prosperity of the days of monarchy. The resplendent *Elephant parade* that starts at the Mysore Palace is an awe-inspiring

sight watched by millions of people every year. *The Ratha Festival* is celebrated by local tribes of Mysore once in every two years. The main attraction of this festival is the offering made by the devotees to the deity- a pair of 'One foot and nine inches' big slippers.

The Bijapur and Pattadakal Music and Dance Festivals, normally held in January every year see the coming together of world renowned musicians and dancers.

The Kargai in March-April is a unique local event held at the Dharmaraja temple, Bangalore.

Koil Podu. Festival of arms held in September, is an important festival celebrated in Madikeri. It emphasises on invoking god's blessings on their weapons. Kodavas gather at the contest to prove their renowned marksmanship with guns. *Huthri*, the harvest festival is another popular festival there. It is in November-December and is famous for '*Parakali*' - a ceremonial stick-fight and war dance. *Madikeri Dasara* held in October is known for its competition of



Yakshagana

decorated temple cars, driving in a procession.

Arasu Kombala (Buffalo race) is an exciting event held every year in Mangalore. The charged up atmosphere of a contest between buffaloes on wet ground is not to be missed. A true test for both man and the mighty beast. ■

HARVARD ON FAT

Harvard's Frank Sacks, M.D., makes a case for an emerging theory that is gaining support.

"A low-fat diet is not necessarily the best diet for preventing heart disease", he contends, "because triglycerides go up, HDLs go down and insulin resistance worsens."

A recent study of healthy men at the University of California at Berkeley backs his belief. Researchers there found that one-third showed unhealthy changes in blood lipids when switched from a 40% fat diet to a 20% or 25% fat diet, including a drop in HDLs and a rise in triglycerides. Another third saw lipids worsen when limited to just 10% fat calories. Although total LDLs remained relatively unchanged, there was a shift in the type of LDLs from large, buoyant LDLs to small, dense LDLs, the baddest of the bad guys. Genetics likely determines which people are susceptible to this shift in LDLs but the trigger may be a low-fat diet.

Sacks believes most consumers would benefit from a diet higher in fat than nutritionists currently recommend. He suggests 35% fat - about what the average American now eats-with one big difference. The fats should be mostly monounsaturated, such as in nuts.

OLEIC ACID IN NUTS

Oleic Acid strengthens and lubricates the body's cells, protects the arteries and fights harmful cholesterol buildup. The body also uses this essential fatty acid to boost the effectiveness of alpha-linolenic acid (LNA). Plus, it increases satiety and stabilizes blood sugar levels, which prevents mood swings and food cravings that lead to bingeing.

How much do you need? About 2 heaping Tbs, of almonds, pistachios, pecans, cashews, hazelnuts, walnuts and macadamias. Nuts are rich in oleic acid, which protects against heart disease. They are fiber-rich, which stabilizes blood sugar, preventing cravings.





MUSHROOM AND CASHEW TART

Tart Dough

Flour	:	200 gm
Fat	:	50 gm
Butter	:	50 gm
Salt	:	4 gm
Garlic, crushed	:	4 flakes
Water	:	as required

Filling

Mushroom	:	100 gm
Cashewnut	:	200 gm
Cheese sauce	:	300 ml
Parsley, chopped	:	15 gm
Salt	:	5 gm
Pepper	:	2 gm
Butter	:	30 gm
Onion, chopped	:	100 gm

Method : 1. Prepare tart dough with the given ingredients and keep for 30 minutes. 2. Make 5 mm thick sheet and cut into 8 tarts of uniform size. 3. Place each one in a "U" shaped tart mould and refrigerate for 10 minutes. 4. Meanwhile melt butter and fry onion, mushroom and cashew bits. After 1 minute add cheese sauce and seasoning. 5. Fill this mixture into the tart and bake at 200°C for 10 minutes.

This can be taken as an evening snack or cocktail titbit or as a breakfast dish

Accompaniment	:	Ripe mango or pineapple with cherry and half-boiled egg.
Portion size	:	200 gm
Portions	:	4.

Source : Indian Cashew Nuts Recipes

Recipes



RHINES GOULASH

Beef, undercut	:	800 gm	Ham, chopped	:	100 gm
Cashew, Split	:	200 gm	Tomato puree	:	100 gm
Red wine	:	50 ml	Butter	:	50 gm
Flour	:	30 gm	DUMPLING		
Potato	:	300 gm	Flour	:	100 gm
Carrot	:	300 gm	Cashew cream	:	100 gm
Button mushroom	:	150 gm	Water	:	50 ml
Celery, sliced	:	50 gm	Butter	:	30 gm
Onion, cubes	:	100 gm	Salt	:	2 gm
Basil	:	10 gm	Brown stock	:	1 ltr
Capsicum	:	100 gm	Paprika, powder	:	1/2 tsp
Dill leaves	:	10 gm	Caraway seeds	:	1/2 tsp
Tomato concasse	:	100 gm			

Method : 1. Make a soft dough with the dumpling ingredients and keep for 1 hour. 2. Divide into balls of 20 gm. 3. Poach in beef stock and remove. Retain the stock. 4. Cut the beef into large cubes and apply salt and red wine. 5. Heat butter and brown the meat in it. 6. Add flavouring, vegetables, salt, pepper, flour and saute further on low fire. 7. After 5 minutes add stock, tomato concasse, cashewnut, capsicum and simmer till cooked. Add half of dill and basil leaves. 8. When cooked, place dumplings on a service bowl and pour the stew over that. 9. Garnish with dill and basil leaves.

Accompaniment	:	Brown bread or steamed breads.
Portion	:	500-600 gm.
Portions	:	4

Source : Indian Cashew Nuts Recipes

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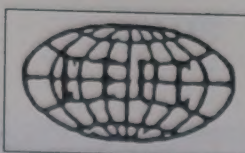
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